THE FINISHING TOUCH

THERE are still some jobs in Mathieson's plants which science just can't reduce to routine. Finishing solid caustic soda, for example, is one which calls for unusual skill on the part of the workman. Thus even at Lake Charles—"the most efficient alkali plant in the world"—it takes men like J. V. Campbell to furnish that "finishing touch" which has so much to do with the quality of Mathieson Solid Caustic.

Jim Campbell, carefully watching over his caustic pots, is one of the hundreds of capable, loyal men who give their best to Mathieson's "big little" jobs. Skillful, proud of their work, these men constitute one of the important reasons for the day-in and day-out dependability of Mathieson Chemicals and Mathieson Service.

The MATHIESON ALKALI WORKS (Inc.)

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Soda Ash . . . Caustic Soda . . . Bicarbonate of Soda . . . Liquid Chlorine . . . Bleaching Powder . . . HTH and HTH-15 Ammonia, Anhydrous and Aqua . . . PH-Plus (Fused Alkali) . . . Sulphur Chloride . . . CCH (Industrial Hypochlorite) Dry Ice (Carbon Dioxide Ice) . . . Analytical Sodium Chlorite

The Reader Writes:—

The National Bankruptcy Act

Whether it was one of the many interesting letters you print or one of your own editorials I do not now remember, but your extremely pertinent remarks on the Roosevelt records of national deficits, recalls to my mind that previous statement that any business executive who so continuously and so seriously underestimated expenses and over-estimated receipts would have been bankrupt or fired within two years.

Seven months ago, the President told the country that the deficit would be less than $1,000,000,000 (which is plenty of dollars) and today he announces that it will be more than $4,000,000,000 (which is the hell of a lot of dollars). He explains this 300 per cent. mis-estimate by telling us that there has been a falling off of $900,000,000 of receipts, which is 15 per cent., offset by an increase of $2,000,000,000 in expenses, which is 30 per cent.

What a Chief Executive!

And he has the nerve, instead of trying day and night to put the Government's business in order, to go round the country on the taxpayer's time, in private cars at the taxpayer's expense, telling the taxpayers how they should run their own little businesses and who they should elect to Congress to help him mis-run the United States into national bankruptcy.

Houston, Tex. ROBERT FERGUSSON

Everything Under Control

You are pretty cocky, but God bless you for having some new ideas and some honest convictions.

St. Louis, Mo. J. D. PHILLIPS

I find in your pages much more material on new products that are of interest to me than in any other journal published; but I resent your political editorials which have no place in a technical or trade journal.

Salem, Mass. OLIVER H. ALLEN

Cancel my subscription on expiration because I do not approve of your biased attitude boosting the office and belittling the laboratory.

Milwaukee, Wisc. F. K. STOKES

Specialized Engineers

The plea recently published to chemical engineers who work in the petroleum, paint, and other non-chemical industries, that they ought to remain chemical engineers, is not logical from the point of view of the men who have become specialists. Their interests, their contacts, their incomes are all derived from industries which are big and important enough to stand upon their own feet, and while I know nothing about the petroleum industry, still I feel certain that it feels, as I am certain the paint industry feels, that it is not and never will be a tail to the chemical industry's kite.

We are being "chemicalized" rapidly, which means that we are using more chemicals and less natural raw materials; also that we are carrying on chemical operations where we formerly did simple grinding and mixing. But just because a man operates a still or a vacuum pressure kettle does not mean that he must belong to the many chemical technical societies to keep up with the scientific progress in the coatings field. As a matter of fact we have more than we can do to keep up with the specialized technical progress right within our own field and have already too many societies and associations of our own. Chemical engineers in the petroleum, paint, textile, leather, ceramics, paper, automotive and foodstuffs fields must all have the same problem, and many of them, I guess, feel as I do about it.

Philadelphia F. WARRENTON NASH

Reductio Ad Absurdum

These chaps, H. Mann Gardiner and H. T. Libby who want to have every chemical mis-statement corrected instantly and publicly, are Simon-pure, incorrigible idealists. The entire membership of the American Chemical Society, which we all know is the largest technical society in the universe, if they worked day and night for seven years, could not refute the chemical mis-statements made only by Government employees, from His Excellency the President down to the Third Assistant Bottle Washer in the Pine Barrens Experiment Station for the Research into the Effects of the Left-handed Application of Fertilizer Materials of Fishscrap Origin upon the Development (if any) of Two-Year Old Radishes.

Let's be sensible as well as scientific.

Atlantic Highlands, N. J. ALFRED E. HAMMOND

Possibilities in Specialties

Mr. W. B. Webster, in his letter in your July issue on the subject of chemists and employment, states the exact truth when he reports that the majority of the larger chemical manufacturers show a decided disinclination to hire those who previously have been employed by competitors while in the consuming fields the direct opposite is true. But I fail to see how this is any sound argument for unionization of technical workers. The plain truth is that there is no sound argument for unionization of chemists at all. Let the chemist throw away his professional standing (poor as it is because of his own shortcomings) and he will find that he has thrown away his heritage for a mess of weak-looking porridge. Let Mr. Webster put his shoulder to the wheel to raise the professional standing of the chemist by joining the American Institute of Chemists, if he is not already a member.

One other thought. Many chemists who find they cannot catch on with the makers of industrial chemicals are overlooking the possibilities in chemical specialties. Yes I know that capital is required, but this can often be gotten if the venture has possibilities.

Lincoln, Neb. J. ARTHUR DREEVES

Saves Fifteen Dollars

CHEMICAL INDUSTRIES is so "darn" good that we have decided to take subscriptions for fifteen of our sales executives and salesmen, and have your magazine mailed to their homes.

I am wondering if you offer any club subscription rates to concerns who subscribe to your magazine on a wholesale basis. If not, we will send in our order at the regular retail rate, but being Yankees, it is worth the price of a 3c stamp to send you this inquiry.

St. Louis, Mo. L. A. PRATT
Monsanto Chemical Co. (Merrimac Division)

ADVERTISING PAGES REMOVED

CHEMICAL INDUSTRIES

The Chemical Business Magazine

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Waterproof or Repellent

DOCKET No. 3222 of the Federal Trade Commission warrants reading by every sales executive in the chemical industries. Write for a copy and note carefully the stipulation that led to a cease and desist order against the makers of the masonry waterproofing compound, Lumino. Lest we be charged with deceiving the consumer and diverting trade from competitors, we hasten to add that in so describing this well-known chemical specialty, we are simply following what is admitted by the Commission to be general trade custom in the nomenclature of many different compounds made and sold to render all sorts of materials from a rayon filament to a concrete dam "impervious to water or nearly so" (Century Dictionary) or "capable of resisting the deleterious action of water" (Oxford Dictionary).

In the face of trade custom and accepted definition unnamed "qualified experts" from the Bureau of Standards, if called, would testify:

> That analyses of a large number of so-called waterproofing and damp-resisting materials or compounds, both of organic and inorganic mineral base, including respondent's . . . product "Lumino," made at the Bureau of Standards, have thus far failed to disclose any absolute waterproofing or moisture-proofing or dampness-prevention material or compound which is a positive, absolute waterproofing or moisture-proofing or dampness-preventing material or compound; that the several products so designated and analyzed are in fact, in varying degrees, only of partial efficacy and uncertain and varying duration . . . and that at the present time, under such circumstances, the use of the unqualified designations . . . of any such products as "waterproofing" or "dampness-preventive" is a misnomer; that water repellent and dampness resisting products are desirable and greatly needed in construction, that many such products are on the market and *they are habitually but erroneously referred to in the industry itself and in the construction industry* (our italics) as "waterproofing" materials or compounds, and that, in common with many others, "Lumino" has merit.

Even by the makers of so-called waterproofing compounds no serious objection can be taken to these statements. They apply equally to the word "proof" linked by common usage to moth and insect, fungus and mildew, fire and heat, acid and alkali. But all the industry has very valid grounds for objection to the handling of this case and the use which is obviously to be made of it as a precedent.

To have selected a firm with particularly aggressive sales methods and find them guilty of misleading the public and injuring competitors, who are admitted to use the same words in the same sense, is more than unfair in its implications. To use this order as a club to force a casein glue-maker, as an actual example, to drop the term "waterproof" is an utterly unwarranted and, we are happy to add, unusual misuse of the Commission's great authority.

It is a great pity that the entire specialty industry did not join with the Lumino Company, first in demanding a thoroughgoing, public investigation of the trade use of the words "proof" and "proofing"; and second, in writing with the Bureau of Standards more exact definitions acceptable to the Federal Trade Commission. It was a missed opportunity to cooperate as an industry with the Government to forestall what now naturally develops into bureaucratic action of the most repugnant character.

Employee Editions of Annual Reports

Realization that employees as well as shareholders have a keen interest in their company's progress, and that they have common problems with the management, has led the presidents of some companies to make a special report to the rank and file of their own organizations. It is a sound idea that is just beginning to attract general attention, and a recent survey by the Metropolitan Life Insurance Company has analyzed and compared such reports of forty-four different corporations. Our own industry furnishes in Mr. Queeny's report to the Monsanto employees a conspicuously successful combination of pleasing presentation with clarity of statement and frankness in discussion of common problems.

Though comparatively new the employee report has already developed a distinctive technique, at least in what all agree is their chief aim of making the company's balance sheet understandable, and in making clear the relationships between the shares of the income that go to stockholders and workers. Thus, these reports become an extension of the idea of simplification of the balance in terms of payrolls rather than of per-share-earnings, so that a per-employee-earnings promises to become another convenient financial formula. Both ideas are signs of a new spirit in industrial management, and a very hopeful spirit it is.

Anything But the Truth

Since T. V. A. is one of the chief experiments of the New Deal, it would seem that friends of Mr. Roosevelt and followers of his ideals of planned economy would be those most eagerly desirous of establishing the true facts about the Morgan scandal. The clash of contradictory personalities in the Authority is plain to all. If the personnel has been incompetent as well, a perfect answer is provided ready-made to those who question the wisdom of the Government's huge investment in power plants.

But not so! And the one fact indubitably established by the hearings before the Congressional Investigating Committee is that extraordinary efforts are being made to prevent the discovery of the whole truth. Arthur Morgan, an engineer of international reputation, is "smeared"; T.V.A. employees are intimidated; what appears to be deliberately conflicting evidence is presented; the counsel of the Committee proves himself so biased that he appears to have been appointed by the President as a special attorney for the defense not of the accused, which theoretically would be somewhat understandable, but of the accusers.

Justice, not only blindfolded, but also handcuffed, is a sad spectacle which becomes all too common in the United States these days.

Shifts Among the Solvents

The solvents were the weak spot in the chemical markets during July. Ethyl alcohol was reduced 2c; butyl alcohol and butyl acetate, ½c; amyl alcohol, 1.7c; and amyl acetate, 1½c. The action on ethyl alcohol and denatured alcohol came somewhat as a surprise, as producers have been insisting that prices were out of line with production costs, and only emphasizes that the deep drop in consumption over the past months has increased the competitive situation. Total production of ethyl alcohol since July 1, 1937, totals only 201,033,857 gallons, as against 223,181,228 in the like period of '36-'37. However, output of denatured since July 1, 1937, amounted to 25,599,317 gallons, as compared with 22,118,378 gallons in the corresponding '36-'37 period. Production of specially denatured, on the other hand, from July 1, 1937, was reported at 69,009,735 gallons, as against 80,084,281 gallons, a decided drop.

Automotive and tire production have declined even more severely than most other lines with the resultant losses in tonnage to solvents makers. The plastics field has been extremely dull since the fall of last year. Industrial sales of lacquer by 580 establishments for the first 5 months, as reported by the Bureau of the Census, amounted to 13,890,838 gallons, as compared with 20,636,831 in the corresponding period of '37, while production of pneumatic casings in the last 5 months reached only 13,353,808 units, as against 27,223,150 in the first 5 months of last year.

Not only have tonnages been restricted, because of poor business conditions, but considerable re-shuffling is going on in the use of solvents. The petroleum solvents are gaining a larger share of the total volume, and price readjustments all along the line are inevitable. But there is a ray of hope. Car manufacturers now report that they fear a shortage of stocks in September and crude rubber consumption figures are again climbing.

Quotation Marks

"The encroachment of government upon national economy is one of the most striking world developments in recent years. The ratio of total government expenditures to national income in various countries is a fairly reliable indicator of this intrusion"—New York *Journal of Commerce.*

The Chemical Economics of Modern Coke Production

By C. J. Ramsburg

Vice-President, Koppers Company

IN the United States in 1937, approximately 75,000,000 tons of coal were carbonized by by-product coke ovens. This represents one car in every six mined, or three cars of coal for each minute—night and day—over the entire year.

In the year 1913, before the big development in coke oven construction began, but 25 per cent. of the coke used was by-product; in 1937 the amount is 95 per cent. Since 1923, 95 per cent. of the ovens built have been of the Koppers-Becker type.

The latest ovens are about 40′ long, 14′ high, 16 to 18″ wide and have a capacity of 18 tons of coal. The oven chamber is heated by gas burned in vertical flues between the oven walls, and the heating so regulated that the coking operation proceeds at the rate of approximately 1″ per hour, under which condition each oven produces approximately 19 tons of coke per day, from 26 tons of pulverized coal (coking time 17 hours).

It is a wonderfully simple process on paper, but the art of building an oven structure so that it will stand the expansion and contraction stresses, so that the heating will be uniform, so that the gases will not become overheated, so that heat efficiency and economy is attained, is an art in itself. It is perhaps not overstating the fact to say that in this art the United States leads the world.

From the 26 tons of coal placed in the oven per day, there is produced besides the 19 tons of coke, approximately

300 M cu. ft. gas (96 M of which may be used for heating)
210 gallons coal tar
600 lbs. sulfate of ammonia
75 gallons of light oil { benzol, toluol, xylol, solvents
120 pounds recoverable sulfur, and other products in small quantity, such as cyanogen.

Different coals have different coking properties and the blending of proper coals for particular purposes is of the greatest importance. The most economical mixture of coals for each location must be determined, based on availability, freight rates, and disposition and value of coke and other products. Practically all coking operations today are conducted on blended coals.

Some years ago in the course of a series of radio talks from KDKA in Pittsburgh on "Science and Industry," F. W. Sperr, Jr., of the Mellon Institute and Koppers Research Corporation, speaking of the United States said:

"It has within its borders more high grade coal than all the rest of the world put together. We may form a mental picture by assuming that all of the coal in each country is spread in a single six foot seam. The coal resources of Great Britain would then cover about the area of the State of Maine; that of Germany would cover the State of Missouri; that of Russia would cover the little States of Connecticut, Delaware and New Jersey, while the coal reserves of the United States would cover the entire States of Virginia, Tennessee, North Carolina, South Carolina, Georgia, Alabama and Mississippi."

In respect to coal reserves we are well prepared. One hundred years ago a great English financier and statesman said that the future belonged to the nation which could produce the most coal. Today we believe that the future belongs to the nation which will make the best use of its coal. It is to be hoped that the care of our coal resources will receive more intelligent handling than has been accorded our natural gas and petroleum resources from a standpoint of conservation. Future generations may well hold the present generation in contempt for its extravagant production and squandering of our petroleum resources.

It will doubtless be of interest to compare our petroleum reserves with our coal reserves. According to carefully made estimates, all the petroleum which is now proved to be available in the United States has a total thermal value equal to the thermal value of a 6 foot seam of coal, spread over the area about 22 miles square. With this comparison in mind, it seems unnecessary to point out that in less than a generation, some other sources of petroleum or petroleum products must be found if we are to maintain our present consumption of liquid fuel.

Coal cleaning is playing a more and more important part in the preparation of the coal used in by-product ovens. This is due not only to the fact that the high grade coking coals of the country are being depleted at a more rapid rate than the total coal reserves, but also because it has been found that the cleaning of even the high grade coals is profitable.

Coal cleaning consists in mechanically removing the impurities. Almost universally this is done by taking advantage of the fact that the impurities are heavier than coal. Both water and air are used as media to support the coal while the impurities sink. Water, because of its much higher specific gravity, is a far more efficient medium and is used to clean at least 90 per cent. of the cleaned coal used in by-product ovens.

Impurities in coking coal have several adverse effects on the product. They increase the ash and usually the

sulfur and also adversely affect the size and strength of the coke. These are invariably disadvantages to its use.

Coal cleaning thus makes available for coking, coals which have the proper coking properties when separated from the impurities found in the seam or unavoidably admixed in the mining operations. The steel industry of the Birmingham District is founded on this fact. The bulk of the coal in that district of coking quality made very inferior coke until coal cleaning plants were installed, resulting in marked improvement in the physical and chemical properties of the coke which markedly increased blast furnace output, improved the quality of the iron and reduced coke consumption per ton of iron. Today over ninety-nine per cent. of the coal charged to by-product ovens in Alabama is cleaned.

In recent years coal cleaning has been adopted in the North for the same economic reasons. Even when applied to coals heretofore considered among the highest quality coals in the United States for the production of metallurgical coke, coal cleaning has shown decided advantages and savings in the cost of producing iron and steel. One such coal cleaning plant, handling some 5,000,000 tons annually and removing refuse averaging only three per cent. by weight, has shown the following advantages:

1. Increased recovery of coal from the mines.
2. Increased yields of metallurgical coke and by-products.
3. A 10 to 15 per cent. improvement in the physical and chemical qualities of the metallurgical coke and a 20 per cent. reduction in the hydrogen sulfide in the gas.

In five blast furnace plants this better coke has produced the following benefits:

1. Coke consumption reduced 5 to 8 per cent.
2. Flux reduced 5 to 10 per cent.
3. Slag volume reduced 7 to 12 per cent.
4. Production of iron increased 5 to 8 per cent. with a lower sulfur content.
5. A substantial reduction in power for blowing the furnaces.

These advantages, after paying all costs of cleaning, show savings in cost of iron sufficient to return coal cleaning plant investment in two to three years. Further, the increased furnace capacity resulting from coal cleaning was obtained at two-thirds the investment cost required for a like capacity in new blast furnaces.

A further very decided advantage of mechanically cleaned coal is its greater uniformity in chemical qualities. A number of carefully made statistical studies on this point have shown that mechanical cleaning of coking coal has reduced the variability of the coal as to ash, sulfur, and phosphorus to from one-half to as much as one-sixth that of the raw coal.

That the great economic advantages of cleaning coal for coking are becoming very widely appreciated is shown by the growth of such practice. Data of the U. S. Bureau of Mines are available for the years 1927 to 1936 inclusive, which shows that the proportion of by-product coal mechanically cleaned has increased 73 per cent., from 14.0 per cent. in 1927 to 24.2 per cent. in 1936.

Passing over the iron and steel industry in coke; of road building; of creosoting, which absorbs the largest proportion of the tar, we come to a field which by weight of the original coal, consists of but two per cent. From the coal tar and from the light oil recovered from the gas are derived naphthalene, benzol, toluol, and solvents, which are of vital importance to the dye industry, chemical industry, varnish and lacquer industry, plastic industry and the drug industry.

When the World War shut off many of these supplied by Europe, the challenge to American industry was taken up and the last twenty years have seen enormous strides in the manufacture of all kinds of perfumes, dyes, insecticides, disinfectants, explosives, plastics, so-called coal-tar drugs and kindred products.

All this brings a very small return to the coke oven operator, and to the tar distiller, but the raw material contained in this two per cent. is the basis for the investment of millions of dollars and products worth millions of dollars per year entering into the manufacture of practically all manufactured goods today. In 1914, the total value of dyes manufactured in this country amounted to but $2,500,000 and those from foreign intermediates. In 1937 this figure approached $150,000,000 and few dyes are made abroad which American dye manufacturers cannot surpass.

Gaining in momentum daily is the business of manufacturing plastics and their use is increasing by leaps and bounds. Few manufactured articles are sold today which do not use in decoration and utility some of these products. Another great industry is the manufacture of paints, varnishes and lacquers. The whole construction industry, electric industry, refrigeration, air conditioning, all make use of material made from coal distillation solvents. For the most part, the starting point is the two per cent. of the coal which has been segregated from the tar distillates and the benzol products secured in coal distillation.

Benzols

The benzol series of hydrocarbons represents the most important raw materials in the organic chemical industry. There is a large amount of current misunderstanding about coal-tar products and care should be taken not to add to this confusion—by-product coke plants produce coal tar, but they seldom refine it, for that is a separate industry. Coal tar refineries sell their raw products derived from the tar to chemical manufacturers who prepare products of intermediate value and complexity. These are passed on to those who specialize in the manufacture of dyes, drugs and perfumes.

From each ton of coal coked, it is possible to obtain, chiefly from the gas, three to three and one-half gallons of volatile liquid which physically resembles gasoline and has been given the general name light oil. When refined, it is suitable for use as a motor fuel. It is even more valuable than gasoline for this purpose, since numerous tests have shown that an automobile operated with benzol will develop considerably more

horse power with less fuel consumption. One hundred million gallons of benzol were produced and used in a blended motor fuel in 1936. While this seems a vast quantity, it is only a cupful in the nation's fuel tanks, so that few get the opportunity of using this high grade liquid fuel. Its anti-knock value is exceedingly high.

About one-fifth of the total benzol or light oil produced is refined into pure products, such as benzene, toluene and solvent naphtha.

The explosives used in the World War were tri-nitrotoluol, better known as T.N.T., and picric acid. They are made from toluene and benzene, respectively, with the aid of nitrogen compounds produced from ammonia.

But benzene and toluene are as important in peace as in war. Not only can the explosives just mentioned be utilized in peaceful arts, such as road building, mining and quarrying, stump removal, etc., but these two oils are basic materials from which the chemist can prepare an amazing variety of dyes, perfumes, drugs and many other classes of compounds.

Gas

Of great importance to the steel plant is the high calorific value gas secured from by-product coke ovens. In the latest oven approximately one-third of the gas produced is necessary to effect the carbonization, or roughly 1050 B.T.U. per pound of coal, releasing after benzol removal, approximately 7,500 cubic feet of 560 B.T.U. gas for use or sale. But fewer and fewer plants are using coke oven gas for underfiring and practically all new steel plant installations of coke ovens are equipped to operate on blast furnace gas, and gas plants and merchant coke plants selling gas are operated on producer gas, thus making available over 11,000 cubic feet of coke oven gas per ton of coal.

Coke oven plants in the big steel centers have found it profitable to sell their surplus gas to city gas operations. In the West the influx of cheap natural gas is destroying this market. In the East, most gas plants use coke oven gas as their base load, utilizing carburetted gas for the balance.

Today in the East, Newark, Jersey City, New York City, Brooklyn, Baltimore, New Haven, Hartford, Providence, Boston, Buffalo, Albany, Rochester are entirely or partially supplied with coke oven gas.

Sulfur

Before coke oven gas can be used for most purposes, it must be purified practically by the removal of sulfur compounds. The new processes for removal of sulfur from gases have made great headway during the last five years. Today there are many plants in operation where the sulfur recovered in the purification process pays for all or part of the purification costs.

For many years it has been the dream of the by-product coke oven engineer to be able to recover the sulfur from the gases in a form in which it might be finally sold as sulfate of ammonia. This has been shown entirely feasible in the treatment of gases in petroleum cracking plants where the sulfur is of high concentration.

For example, the plant erected for the Standard Oil of California is securing a yield of over 80 tons of sulfuric acid per day. There is also the added benefit of an almost complete cessation of corrosion in the oil refinery and an improvement in the conditions of the worker. At Philadelphia, a new plant of the Atlantic Refining Company, engaged in effecting the practically complete removal of over a pound of sulfur per thousand cubic feet of gas from cracking stills, is not only placing the gas in proper condition for polymerization into high octane gasoline, but recovering the sulfur as H_2S, so that sulfuric acid will be soon in production.

The use of similar processes can be readily extended to the purification of coke oven gas or gas from other sources. At the present time at Belle, W. Va., the du Pont Company is recovering sulfur from 80,000,000 cubic feet of blue gas per day, and using the sulfur for the manufacture of sulfuric acid. The gas is of particularly low concentration. At Troy, N. Y., coke oven gas is being purified, the sulfur being recovered in a form that is extremely valuable in agricultural uses as an insecticide and fungicide.

Sulfate of Ammonia

There was a time when the recovery of ammonia was a very profitable operation. That was up to the close of the World War. Since that time, the development of synthetic ammonia produced from atmospheric nitrogen has greatly influenced the price. At the present time the necessarily large investment in apparatus, the price of the necessary sulfuric acid and the low selling price made the recovery of this by-product more a necessity from a standpoint of gas conditioning than a matter of profit. Ammonia is a necessity in war, and a high grade source of plant nitrogen in war and peace. Preparations for war and necessity for upkeep of synthetic plants make the price of nitrogen as ammonia a very uncertain one. Its value is without question. We are looking forward to the time when present research work in sulfur removal will make it possible to remove sulfur from the gas, and sell it as an ingredient of sulfate of ammonia.

During 1937 there was a gross production in U.S.A. of approximately 750,000 tons, in by-product coke ovens.

Coal Products in Medicinals

Most people agree that man's greatest objective in life is happiness; and that good health contributes more toward its realization than does education, power, or wealth. The importance of coal products in determining the causes of sickness, in the prevention, diagnosis, treatment, and cure of disease, and in the alleviation of suffering, can scarcely be over-estimated. Since Lord Lister in 1867 introduced phenol for preventing sepsis, countless lives have been saved as a result of that event which began a new epoch in surgery.

The widespread use of coal-tar crudes and intermedi-

ates such as phenol and cresylates in household, industrial, and agricultural sanitation is too well known to require discussion. Aniline dyes such as fuchsine are now used, for example, in detecting the tubercle bacillus; and methylene blue is invaluable in demonstrating the malarial parasite; in typing the pneumococci; and in examining the functions of the liver and kidneys. These and other biological stains are indispensable in the early diagnosis of numerous diseases today.

Modern chemotherapy began with the work of Ehrlich, the discoverer of Salvarsan for the specific treatment of syphilis. This compound and others used to combat tropical diseases and recurrent fever are obtainable in the manufacture of fuchsine. Other coal products useful in medicine include: acetanilide; procaine, and other improved substitutes for cocaine in local anaesthesia; the barbiturate hypnotics; mercurochrome, a derivative of fluorescein; chloramine T; the cathartic phenolphthalein; the antipyretics and analgesics phenacetin and antipyrine; the internal antiseptic Hexylresorcinol; substitutes for quinine such as plasmoquin and plasmocid; and even navigan, a derivative of piperidine, proposed as a remedy for seasickness. Properly used the new aniline derivative sulfanilamide (Prontylin), employed first on mice as recently as 1935, or related compounds now being studied, may become a boon in the treatment of hemolytic streptococcal and certain other often-fatal infections.

Since 1929 research on the chemistry of the natural products related to phenanthrene, a constituent of coal tar, has shown remarkable progress. These brilliant investigations have indicated that substances as different as the morphine alkaloids, cancer-producing hydrocarbons, sterols and bile acids, the crystalline vitamin D, sex hormones, digitalin, heart poisons, such as the deadly vegetable arrow-poisons of the tropics and the animal poisons secreted by toads, as well as certain saponins, are all closely related chemically to each other and to phenanthrene. No one today can foresee all of the results of these and continuing studies on the chemistry of phenanthrene derivatives, but it appears that they will result in great advances in our conquest of disease and even in our knowledge of the origin and termination of life itself.

In 1935 the 38 domestic manufacturers of finished coal-tar medicinals reported an output of 10,022,667 pounds, and sales of 8,949,747 pounds valued at $8,371,901. The largest production of any one of these 111 different chemicals was 4,052,453 pounds of aspirin. The number of headaches cured by these 2,026 tons of acetyl-salicylic acid, a derivative of phenol, is incalculable. A total of 22,485 pounds of coal-tar medicinals comprising 94 different products, of which 67 were noncompetitive with American chemicals, was also imported during that year. By contrast, the 63 different synthetic medicinals of non-coal-tar origin produced in the United States during 1935 totalled only 751,225 pounds.

Although these statistics, which exclude coal-tar crudes and intermediates used as general disinfectants, are of general interest, and important to the manufacturer of synthetic drugs, yet they are no measure of the value of coal-tar chemicals to the health and happiness of the nation. They do reflect, however, the resourcefulness of American chemistry, the faith of capital in an industry which was almost non-existent before the World War, and the progressiveness of medicine in the United States. The continued cooperation of chemists, investors, and physicians in the further development of medicinal products derived from coal will advance still further our knowledge of the causes, prevention, and cure of disease.

The continued use of coke in the manufacture of pig iron, and for foundry and domestic heating, will undoubtedly give coke plants a continuance of the present importance far into the future. Further uses for tar and light oil products will no doubt be developed, both for peace time purposes and for national defense. In addition the waning petroleum reserve will cause the nation to look more and more to coal as a source of its liquid fuel.

In an effort for self support, Germany is faced with a situation which in a comparatively few years will face America—scarcity of oil. While it is true that new methods of cracking, of polymerization, of new sources of power such as the modern Diesel engine, are resulting in more efficient utilization of crude oil, nevertheless, the vast quantities involved will make it imperative eventually to turn to coal.

German developments are in three directions:

1st—The Bergius System of hydrogenation of coal.
2nd—The Potts method of coal liquefaction by means of Tetralin (a hydrogenated naphthalene product).
3rd—By the Fischer-Tropsch Process—of synthetic production from gases.

It is to the latter method that the coke oven seems most related. Coke oven gas from which the more valuable chemicals have been removed combined with a special blue gas produced from coke, gives the necessary combination which, when heated in the presence of a special catalyzer, produces an oil of high quality, which when reformed, gives an excellent gasoline and a very high grade of lubricating oil.

Eventually there will be produced from coal, gasoline and lubricating oils at cost competitive with the then rising costs of petroleum products. Each year brings not only our country, but all other countries, closer to the realization that the future of any nation depends on its coal reserves and on the proper utilization of them.

German Synthetic Rubber Output

Production of synthetic rubber in Germany during 1938 may reach 25,000 metric tons, which would be approximately 25 per cent. of all rubber consumed in that country last year, according to a report from the American Consulate at Frankfort-on-Main. There are now two plants engaged in the production of synthetic rubber in Germany. Although the cost is still considerably higher than that of crude rubber, it has been substantially reduced, the report states.

CREATING INDUSTRIES
1918—1938

A Series of Fifty Articles Reviewing the Progress of American Chemical Industry

Rayon

By Stanley B. Hunt

Man-made textile fibres are, so far as the United States is concerned, almost entirely a development of the past twenty years. During that period progress that is prodigious has been made both in quality and in cost with the inevitable result that there has been registered also a very great increase in consumption and new applications in very diverse fields. Stanley B. Hunt, director of the Textile Economics Bureau and editor of *The Rayon Organon,* was trained as an engineer at Illinois and later did post-graduate work in economics at Harvard. He was for five years statistician and economic editor of the Tubize Chatillon Corporation, before organizing his present consulting business in 1935, and is widely recognized as our outstanding economic authority upon the synthetic fibres industry. The story he tells, while it is well laced with facts and figures, is told with a surety and simplicity that is highly convincing and withal so deftly that it is indeed far removed from the preconceived notion of what a statistical study of industrial economics is apt to be.

Solvents and Plasticizers

By Carleton Ellis

Enormous productive energy under expert chemical control might well serve as a summary of Carleton Ellis. Certainly few technical men have ever been able to equal the quantity and the quality of his activities. For more than thirty years he has been president and chemical director of the Ellis-Foster Company. More than seven hundred patents have been issued to him. He is the author of three monumental books, any single one of which could well be the *magnum opus* of an exceedingly capable and industrious chemical expert. Besides "The Hydrogenation of Organic Substances" (3rd Edition); "The Chemistry of Petroleum Derivatives" in two volumes, and "The Chemistry of Synthetic Resins" (2nd Edition), he has written a number of other, lesser works, ranging in subject from "Ultra-Violet Light" to his recently published "Soilless Growth of Plants." Educated at the Massachusetts Institute of Technology, where he taught for two years, he founded the firm which he still heads. Throughout his career he has been particularly interested in plastics, in solvents, and in plasticizers; and the chapter he contributes is backed by long experience, intimate contact, and a rare economic sense.

This Series of Articles will be Continued Each Month

Rayon

1918—1938

By Stanley B. Hunt

THE past twenty years have witnessed the rise of rayon from obscurity to a place of real importance in the textile world. Scoffed at in the early days as a poor imitation or substitute, the rayon of today is recognized by virtue of its constant improvements as a new and quality textile fiber. This progress is summed up by stating that American rayon production has grown from a mere 5,800,000 pounds in 1918 to 343,000,000 pounds in 1937.

The present size and importance of the American rayon industry is also shown by the number of people employed in its various units. The rayon producing industry alone employs some 55,000 workers. An additional 100,000 workers are in the rayon weaving mills and about 40,000 employees in the rayon knitting industry. Also hundreds of thousands of people are employed in the converting, dyeing and finishing of rayon, in the rayon garment cutting trades, and in all phases of distribution. The rayon industry has indeed become an important employer of labor in this country.

The amazing growth of rayon production has contributed much business to other industries, especially the various chemical industries and the wood pulp industry. By its consumption of cotton linters, the rayon industry also has created a sizeable market for an American agricultural product. The following table gives some idea of the products used by the rayon industry during 1937.

Product	*Pounds*
Caustic Soda (100%)	300,000,000
Sulfuric Acid (100%)	425,000,000
Carbon Disulfide	85,000,000
Wood Pulp	280,000,000
Glucose	165,000,000
Cotton Linters	80,000,000
Acetic Acid	185,000,000
Acetic Anhydride	185,000,000
Acetone	300,000,000

Also many other items such as titanium dioxide, soda ash, sodium sulfate, etc.

It should be noted in the above table that the quantities shown are the gross amounts used. There is considerable recovery of some chemicals, but the exact amounts are not accurately known inasmuch as recovery varies for individual manufacturing units.

The basic raw material used in the production of rayon is cellulose. The twenty years under review have brought no changes in the sources of raw materials from which rayon cellulose is obtained in the United States, namely, sulfite wood pulp and cotton linters. The intervening years have seen the successful use on a laboratory scale of other cellulose sources, such as sugar cane and corn stalks; but these materials have not been able to compete commercially with respect to cost, purity, and uniformity-of-cellulose-content with wood pulp and linters.

During this period, however, considerable progress has been made in improving the qualities of both wood pulp and cotton linters. Manufacturers of rayon, in cooperation with suppliers of wood pulp and linters, constantly have sought to perfect means by which a purer and more uniform cellulose could be obtained from these raw materials. Today the makers of chemical pulp from wood have research and control laboratories, and in some cases semi-commercial spinning units, for testing the quality and the performance of pulp. This enables them to deliver a uniformly high grade to rayon manufacturers. Similarly, the bleached linters used today are prepared according to strict specifications and are carefully analyzed and subjected periodically to sample spinning tests.

The most recent and noteworthy development in raw materials has been the production of high-grade rayon pulp from southern slash pine. As yet, this pulp has not been used in large quantities commercially, but from all reports it measures up in chemical standards and cost to the present chief sources of rayon pulp, which are western hemlock and northern spruce. The large amount of southern pine available and the ease and rapidity with which this type of timber can be grown should provide the rayon industry with a satisfactory, adequate, and low-cost source of cellulose supply for the future.

Rayon is produced by three processes of manufacture in the United States today; namely, the viscose process, the acetate process, and the cuprammonium process. From 1920 to 1934 rayon also was produced in this country by the nitrocellulose process.

The fundamental principle is the same in all three processes. Cellulose is converted into a solution and then this solution is forced through the tiny holes of a spinnerette into a medium that coagulates the fine streams as they emerge. Thus a cellulose or cellulose-compound thread of continuous filaments is formed which can be conditioned, processed, twisted, or coned as required.

The first domestic rayon yarn, on a commercial scale, was produced by the viscose process in 1911 and today over 70 per cent. of domestic rayon is made by this process (there was experimental production in this country in 1903-5). In this method of manufacture, the cellulose is treated with caustic soda and carbon disulfide to form cellulose xanthate which in turn is dissolved in dilute caustic soda. This solution is known as "viscose." By forcing this solution through spinnerettes into a special acid coagulating bath, the filaments of regenerated cellulose are formed. These filaments are then washed, desulfurized, bleached, dried, twisted, and packaged. The chemicals used in this process are all relatively cheap, recoveries need not be elaborate, and the process can be adjusted to give yarns of widely different characteristics.

In 1919 the acetate process made its first commercial appearance in the United States. In this process the cellulose acetate is formed by treating cellulose with acetic acid and acetic anhydride in the presence of a catalyst. After a partial hydrolysis, the product is soluble in acetone. This solution is then dry spun, the coagulating medium being warm air. The resulting yarn needs no further treatment, but is simply twisted or otherwise manipulated into the desired package form. In this process the final product is an ester of cellulose. Thus it differs chemically, physically, and mechanically from the regenerated cellulose yarns.

The Cuprammonium Process

The cuprammonium process came into American production in 1926. In this process the cellulose is dissolved in an ammoniacal solution of copper oxide, while the coagulating medium is a dilute caustic solution. The coagulation results directly in threads of regenerated cellulose, so it is only necessary to remove all adhering copper with acid and then wash and dry the yarn. An outstanding characteristic of this process is that the filaments, because of their very plastic nature as formed, may be drawn out to very small sizes, thus making it easier to spin very fine filaments.

There has been relatively little change in the mechanical set-up of these rayon producing processes. Each process follows substantially the same production procedures and chemical sequences as twenty years ago. However, in 1931 the Furness Corporation (successor company, New Process Rayon, Inc.) invented and patented a machine for continuous spinning, treating, washing, drying, and packaging of cuprammonium yarn. Subsequently, the Industrial Rayon Corporation developed a continuous type of spinning and processing machine for the viscose process.

Great progress has been made, however, in the standardization and simplification of all three manufacturing processes and in the general improvement in the technique of operation. Spinning solutions are now prepared with less waste; the spinning and processing machinery has been simplified in design; the present spinning machines are very rugged and they operate with greater speed and precision; temperatures and solution concentrations are rigidly controlled; the moisture content of the air in the various processing areas is carefully regulated; methods of bleaching have been improved; and there is greater speed and control in the packaging of the yarn. These are but a few of the improvements that have brought rayon manufacturing to the present point of high precision and scientific control.

Yarn Properties

Hand in hand with these various technological achievements have come corresponding improvements in rayon yarn quality. The uniformity, textile strength, luster control, filament sizes, and denier range of rayon yarns constantly have been bettered.

The scientific conditions under which rayon is produced have endowed it with a controllable uniformity not realizable in other textile fibers. Uniformity of luster, denier, and dyeing properties are but a few of the qualities possessed by the present-day rayon yarns. Back in the early days, production difficulties were often responsible for varying yarn characteristics. For example, one of the most common of these yarn imperfections was the elongation or stretching of certain sections of yarn by unequal tension during some phase of the spinning or coning operations. These attenuated parts possessed different dye affinities from the perfect sections of the yarn, making it impossible to dye a yarn of this nature uniformly. Such inequalities have been essentially eliminated today by greater control in manufacture, as rayon yarn producers continually strive for even greater uniformity.

Tensile Strength

The tensile strength of rayon yarns has been improved constantly. In 1928 it was reported (in Wheeler's "The Manufacture of Artificial Silk," 1928) that the dry strength of the viscose process type of rayon was 1.37 grams per denier and the wet strength 0.64 grams per denier. In 1935, a reliable authority (Schwarz and Mauersberger, "Rayon and Synthetic Yarn Handbook," Second Edition) states that the dry strength of viscose yarns was 2.09 grams per denier and wet 0.91 grams per denier. In eight years the dry strength had increased 52.5 per cent. and the wet strength 42.2 per cent. Similarly, the strength of the acetate and cuprammonium process yarns has increased.

Luster Control

One of the most important developments in rayon has been the discovery of ways by which rayon yarns can be delustered or pigmented. Prior to 1926, rayon yarns were made only in the "bright" luster which restricted the use of rayon to lustrous fabrics. That year

The Viscose Company introduced semi-dull luster, after having conceived that, by placing a special constituent in the spinning solution, a "semi-dull" yarn could be obtained. This innovation brought rayon into those dress fabric fields where subdued lusters were desirable. In 1929, the next step in delustering was made when the "full-dull" yarn was introduced. These dull yarns found immediate application in such uses as crepes, underwear, and drapery and upholstery fabrics. Thus the development of delustered yarns contributed greatly to the expansion in the use of rayon.

In the production of these delustered yarns the rayon manufacturers have taken a leaf from the book of the paint and lacquer manufacturers. Prior to the spinning of a delustered yarn, an inert, finely-divided material is incorporated in the spinning solution, which remains intact with the filament after spinning. The most common delusterant material used in rayon yarns today is titanium dioxide. Because this delusterant is an integral part of the yarn, the delustering of rayon is permanent.

The silkworm spins a filament which averages about 1.5 denier. This fineness of filament has been achieved after many years of careful sericulture. Similarly, the rayon manufacturers have reduced the size of rayon filaments spun by their machines. In 1918, for example, the typical 150 denier rayon yarn contained 12 filaments, or 12.5 denier per filament, while today there is commercially produced a 150 denier rayon yarn with 225 filaments, or 2/3 of one denier per filament. Such a yarn is about twice as fine as the average silk filament. Thus rayon fabrics made of multifilament rayon yarns are very soft and supple, possessing excellent draping qualities and resistance to creasing.

Denier Range

During the past twenty years, the denier or size range of rayon yarns for commercial use has been enlarged, which again exemplifies the versatility of this textile. In 1920, for example, filament rayon yarns were generally not produced finer than 150 denier. The twenties, however, marked the beginning of the movement toward finer deniers when the 125, 100, 75 and 50 denier yarns came into prominence. These finer deniers have found wide use in the tricolette and milanese knitted fabrics and in many of the sheer woven dress fabrics for women's wear. Over this period too the heavy denier end of the scale moved upward as the 600 and 900 denier came into use in such items as draperies, plushes, and other pile fabrics. For volume use, the denier scale now extends to include all deniers from 45 to 900, although some commercial yarns are made both above and below these limits.

Improvement in Fabricating

Numerous technological developments in the weaving and knitting industries have also contributed greatly to the progress of rayon. Upon its birth twenty-five years ago, there were available to rayon only the equipment and operating techniques used on the natural fibers. Naturally the application of these older methods of fabrication to rayon caused many difficulties, inasmuch as the new fiber possessed many individual characteristics that required special handling, particularly in those early days. But the weaving and knitting trades soon took cognizance of rayon's individuality and thereafter progress was speedily made.

The weaving industry, which has become the greatest consumer of rayon yarn, was initially ill-equipped to handle this new fiber. Such developments, however, as the high speed cone creels, which have increased the speed of warping rayon yarns from 80 yards per minute to a speed of over 300 yards per minute; the invention of special warp sizing machines to meet the particular requirements of fine denier rayon yarns; the building of high-speed automatic weaving looms designed especially to handle rayon yarns; the development of suitable loom shuttles for the multifilament yarns and the crepe filling yarns; and the introduction of the flat quills to increase shuttle capacity—such factors as these have brought the weaving industry to a point where the handling and fabrication of rayon yarns is performed with great skill and efficiency. In addition, the development of rayon weaving equipment has provided textile machinery manufacturers with a new and large market.

During the early days, the knitting trade generally was better prepared to handle rayon than the weaving industry. The comparative ease with which knitting machines were adjusted to "take" rayon induced knitters to become the first branch of the textile industry to use rayon in volume. Although there has been no radical evolution in the types of knitting equipment used for rayons, many improvements, particularly in the direction of increased machine speeds, as well as knitting machines which will handle the fine denier rayon yarns, have greatly increased the efficiency of operation and improved the quality of knitted rayon fabrics.

Dyeing and Finishing Rayons

The dyeing and finishing of rayon fabrics have been constantly bettered. Special dyeing equipment and new dyeing techniques have been developed to cope with special dyeing characteristics of rayon. The dye affinities and characteristics of the various rayon yarns are better known today, which knowledge has resulted not only in a demand for new dyes, but also has made it possible to produce rayon fabrics in many new and beautiful colors.

One of the early complaints about rayon centered on the variable shades produced when the fabric was dyed. This difficulty not only caused a demand for more uniform dyeing, but also required the dye manufacturers to produce dyes which would minimize variable dye absorption. Today it is possible for rayon

fabrics, whether made from dyed yarns or dyed in the piece, to be dyed both uniformly and color fast.

The resistance of acetate yarns toward those dyes used for the dyeing of the natural fibers, as well as those dyes used for the viscose and cuprammonium rayons, created a serious problem at first. This difficulty was overcome by an entirely new class of colors which could be used for acetate rayon. Because the acetate yarns "take" special dyes, it has been found that by using this type of yarn in combination with other fibers it is possible to produce cross-dye or two-toned effects in fabrics. This desirable cross-dye effect has been employed widely to obtain novelty, high-style fabrics.

Special Yarns

The previous discussions have dealt with only the standard yarns. There are, however, a number of miscellaneous and novel rayon yarns produced. There are the flat filaments that can be either a monofilament or a yarn composed of a variable number of filaments. This type of yarn is stiff and wiry and is used widely for millinery purposes. Also there are the "Thick and Thin" or slub yarns which, when fabricated, simulate the pongee and shantung type fabrics. A recent development of 1½ denier filaments, in yarn made of 100-denier size of 66 filaments, has found use in lingerie fabrics of fine texture. These special yarns again illustrate the versatility of rayon.

New Uses for Rayon

Rayon progress in the apparel fields has been so remarkable that it has somewhat obscured the developments of rayon for non-apparel uses. One of the most notable of these new uses has been the adapting of an exceptionally-strong viscose rayon yarn for use in tire cord. When plied into cords, this new yarn produces a tire cord superior to the best that has been made with cotton. The ability of this new yarn to withstand excessive heat has led to its use in that class of tires where resistance to high temperatures plays an important part in the life of the tire as, for example, in tires for heavy trucks and buses travelling at high speeds. This same new yarn was also used to make the quadrilateral jib sail for the racing yacht "Ranger" last year.

Considerable work is now being performed by the United States Bureau of Standards at Wright Field, Dayton, Ohio, on rayon fabrics for parachutes. As yet, however, the investigation is in the experimental stage. Nevertheless, it is another example of the amazing versatility of this new product, rayon.

The cuprammonium-type yarn has been used in typewriter ribbons, a field which cotton and silk shared until now. This new rayon ribbon is said to be superior with respect to sharp, clean writing and is claimed to have a long ink life and durability.

Since the inception of the continuous filament rayon yarn itself, no other development in the history of the rayon industry has been of more importance than that of rayon staple fiber.

Rayon Staple Fiber

The first domestic rayon staple fiber was produced commercially by the viscose process. The early history of viscose staple fiber was one of "fits and starts," since the demand for this textile depended upon the rise and fall of various fads and style cycles. By 1930, however, the producers of staple fiber, the yarn spinners, and the fabricators had become so familiar with the properties of this new product that new and successful uses were discovered which have created a regular and increasing demand for staple fiber.

The viscose process type of staple was followed by the introduction in the United States of acetate staple fiber in 1935, and the cuprammonium type of fiber in late 1937.

Most of the staple fiber used today is produced by the viscose process. In the production of viscose staple fiber, the procedure of manufacture is identical to that of the continuous filament yarn up to the point of spinning the viscose solution into yarn. The spinning is done on a special staple fiber machine by the use of spinnerettes or jets which have a great many more holes per jet than those used for spinning the continuous filament type of yarn. Thus these filaments are spun in a "rope-like" form which later is cut into short lengths. These short fibers may then be taken by the cotton, spun silk, wool, or worsted yarn spinners and spun, like the natural fibers, into a yarn. This yarn is known as spun rayon yarn.

Rayon staple fiber may be cut in varying lengths by the producer. The length of the fiber is determined by the system of yarn spinning which will be used later. For the cotton spinning system, the fibers may be cut about 1½ inches long. Lengths of 3 inches are usually used by the silk spinning system, while lengths of 4 inches or over may be required for the worsted spinning system. Similarly, the denier size of the individual filaments may be varied by the producer according to requirements.

Adaptation of Spun Yarn

Spun rayon yarn has found wide application in many kinds of textile fabrics. The plain-weave linen effect made from 100 per cent. spun rayon was among the early successes. Included in this category also are the washable shantungs which have enjoyed such popularity that they have become staple numbers in many fabric lines. Spun rayon challis-type cloths have been successfully used in dresses, neckwear, and robes, for example. Also many current lines of men's and women's suitings contain considerable quantities of spun rayon.

Spun rayon fabrics simulating wool and worsted have received wide consumer recognition and offer great potentialities. In both the men's wear and women's wear fields, the cotton spinner has been given great opportunities for developing these fabrics. Gabardines, homespuns, and tweeds are just a few of the more popular fabrics that have enjoyed considerable success.

Spun rayon is used in fabrics other than wearing apparel, such as plushes, velvets, upholsteries, draperies, and narrow fabrics. It has been in the upholstery and pile fabrics that acetate staple has found its widest application, particularly in the field of automobile upholsteries where blends of 40 per cent. acetate staple with worsted have met with considerable success.

Spun rayon is also being used in knitted fabrics. Spun rayon underwear, gloves of spun rayon and worsted, and men's hosiery are just a few of the knitted fabrics that have adopted this new textile.

Besides offering the consumer these new values in price and style, staple fiber has also been of benefit to textile fabricators. Since staple fiber can be spun on the cotton system of yarn spinning, and spun rayon yarn can be woven by cotton weavers, these fabricators are given the opportunity to utilize their machinery and equipment more completely. Furthermore, cotton spinners and weavers now may produce worsted-like yarns and fabrics in competition with the woolen and worsted industries. Similarly, staple fiber offers the opportunity for the woolen and worsted trades to progress, especially along the lines of better cross-dye and other style effects in all-spun-rayon fabrics and mixture fabrics of spun rayon and wool or spun rayon and worsted. Also, spun rayons may be easily dyed, and without additional cost to the dyers, inasmuch as the dyeing of this textile can be performed satisfactorily by methods now known and used for other textiles.

At this point it might be well to mention another kind of synthetic staple fiber that is attracting much attention, namely, Lanital. This fiber is not rayon, but is a fiber made from casein (skimmed milk). Lanital production has been highly developed by Italy, but as yet it is not produced in the United States.

Conclusion

In summary it may be said that the many technological developments in the rayon industry during the last twenty years in the United States have succeeded in developing a fiber that is new and individual. Produced under scientifically-controlled conditions, rayon today possesses a uniformity and versatility that is unexcelled by any other textile fiber.

The progress of the rayon industry has been of great benefit to other industries and the consumer. The growth of rayon production has provided a large market for the products of the chemical industries, textile machinery industry, and for agricultural products. Rayon has given the textile fabricating groups, namely the weavers, knitters, dyers, finishers and converters, not only a quality product of uniform properties at a low cost, but also the opportunity to develop an ever-widening range of new fabrics to satisfy consumers' demand. And to the consumer, rayon fabrics offer the maximum style and serviceability per dollar spent.

What of rayon's future? With these great accomplishments of the past twenty years, it is impossible to predict what the next twenty years will bring. For the immediate future we can look for a greater refinement in the present properties of rayon, the development of new properties, continued expansion in textile uses, and the wider application of rayon in non-apparel.

Industry's Bookshelf

Asphalts and Allied Substances by Herbert Abraham, Van Nostrand, N. Y., 1491 pp., $10.00. Fourth edition of this standard work contains completely rewritten section on methods of testing, and the addition of more than twelve thousand patent references and nine hundred items in the bibliography. The text throughout has been carefully revised, corrected, and supplemented.

Modern Theories of Organic Chemistry by H. B. Watson, Oxford Press, N. Y., 218 pp., $4.50. A concise, simplified exposition of the theoretical basis of organic chemistry in the light of new discoveries, notably in the electronic theory of valency.

Economics I, American Institute of Banking, N. Y., 544 pp., prepared by Willard E. Atkins. This is a text book for use in adult classes under the auspices of the American Institute of Banking; a general introduction to economics in not too rigidly the class room style.

Chemistry, Matter & Life by Stephen and L. M. Miall, Macmillan, N. Y., 296 pp., $2.60. Principally from the basis of physical chemistry, a semi-popular, very lucid interpretation of chemical processes in connection with the place of chemistry in industry and daily life.

The Law of Contracts and Sales by J. F. Christ, Longmans, Green, N. Y., 232 pp. (paper bound), $1.00. Worthy addition to the American Business Fundamental Series: first class non-technical treatment of the subject for executives and engineers.

America's Stake in International Investments by Cleona Lewis, Brookings, Washington, 697 pp., $4.00. Studies statistically and critically the debtor-creditor position of the United States from 1783 to date, and discusses the pressing problem of the migrations of capital.

The World of Atoms by Arthur Haas. A second edition translated by G. D. Walsh and H. S. Uhler, Van Nostrand, N. Y., 183 pp., $3.00. A revised and enlarged edition of twelve mathematical lectures on atomic physics.

Poisons by Hugo Glaser, Hutchinson's, London, 292 pp., 8s, 6d. From poison arrows to gas warfare, from illuminating gas to obscure biological serums, this book ranges over the entire little known field of poisons in a volume of unusual value and extraordinary interest.

Combustion, Flames and Explosions of Gases by Bernard Lewis and Guenther von Elbe, Macmillan, N. Y. C., 415 pp., $5.50. A needed up-to-date summary of combustion phenomenon with special emphasis on physical and practical considerations.

Solvents and Plasticizers

1918—1938

By Carleton Ellis

BY solvents we usually mean organic liquids, and the solvent industry is the provider of those liquids such as are used for coating compositions, oil extraction, dry cleaning, degreasing, scouring, varnish removers, rubber cements, dopes, sprays, stains, household cements, vehicles for pharmaceuticals, etc. Refrigerants, antifreezes, brake liquids, lubricants, fuels, heat-transfer liquids, fire extinguishers also demand "solvents," but these fields do not apply to the solvent properties but to other specific physical characteristics of the liquids.

The solvents of earlier days included principally petroleum naphthas, coal-tar liquids, alcohol and by-products of alcoholic fermentation, wood-distillation liquids, chlorinated compounds and carbon disulfide. The World War demanded larger quantities of acetone than were readily available from the then-existing sources, which resulted in the establishment of an acetone fermentation process. This process also provided large quantities of normal butyl alcohol as an unwanted by-product.

The growth of the automobile industry required a faster drying coating. The recognition of the virtues of low-viscosity nitrocellulose as a lacquer base and the simultaneous provision of an unlimited source of butyl alcohol from which butyl acetate could be made to supply sufficient solvent to meet this demand, were the two developments responsible for the modern solvents industry. It may be said that the solvents industry came in by automobile. Previously, the main solvent used in lacquers of the old type was an amyl acetate (banana oil) made by esterifying the alcohols of fusel oil, a by-product of alcohol fermentation. Butyl acetate proved a cheaper, more available substitute.

With the nitrocellulose coating industry, lacquers were studied more intensively. The solvent or solvent mixture used gives the first impression on inspecting or testing a lacquer. It determines the odor, drying time, viscosity, tendency to whiten during drying and the general performance of the lacquer up to the time the solvent has been eliminated and the solid film is formed. Ability to dissolve is only one requirement, and other factors must also be considered. Evaporation rate is important and must be suited to the manner of use. The solvent should be colorless, non-toxic, stable, and in general without a disagreeable odor. The boiling point of useful lacquer solvents is between about 60° and 160° C., and only for special effects are solvents chosen outside this range. After the general acceptance of lacquers, to meet definite requirements of manufacturer and user, a large number of solvents appeared on the market. Many of these were entirely new. Others had been laboratory curiosities until prepared by newly discovered processes. Some of the older solvents were made on a wider scale than previously. Twenty years ago secondary alcohols (from petroleum) were in their infancy. Butanol was mainly a laboratory preparation. A few ether-alcohols had been described, but most of these solvents, which are now produced on a large scale, were unborn.

Therefore, except in a few cases, there is really no comparison of present prices with those prevailing twenty years ago. For example, acetone (from wood distillation) was about 25c per pound; today (by fermentation and synthesis) it is about 6c. Wood alcohol (from wood distillation) was 92c per gallon; today methanol (synthesized in an entirely different manner) is about 38c per gallon and a far purer product than the old wood alcohol. Amyl acetate for the old-style lacquers brought about $5 per gallon; today a type of amyl acetate synthesized from petroleum is about 80c per gallon. Carbon disulfide was widely used in the rubber industry; today it is seldom met with as a solvent but used for synthesis. Although the paint and varnish industry could get along fairly well today with the solvents which were available twenty years ago, these thinners have been improved, and other types are available now, particularly in petroleum naphthas and naval stores liquids. Part of the credit for cheap diverse solvents today is due to advances in the science of distillation. The efficient separation of complex mixtures by fractional distillation has resulted in better recovery and higher standards of purity. Today even anhydrous ethyl alcohol is marketed.

Synthetic resin coating and impregnating compositions contributed to the demand for solvents. Also, cellulose acetate put in its bid for special dissolvers. Today it is fairly correct to say that for any soluble substance a solvent is commercially available for it. Future changes of base materials for lacquers may result in further development of other types of solvents

which at present are little used, such as aldehydes, acetals, thioethers, alkyl sulfites, and amines.

Considered from a pessimistic point of view, all uses of solvents (except a relatively few involving solvent recovery) result in their waste. A non-volatile substance is dissolved and placed where wanted by liquid transfer; the solvent is then allowed to evaporate from the solution, usually into the atmosphere. Thus it would seem to be a serious drain on physical resources to elaborate a liquid only to waste it to the air. However, one thing particularly characteristic of the solvent industry is the fundamental availability of its products as a whole. There is often competition between purely chemical and biological (fermentation) processes, and whatever method is used to produce a particular solvent depends usually upon the immediate accessibility of the raw material. For example, acetone may be obtained by any of the following routes: (1) wood to acetic acid to acetone; (2) carbohydrates to acetone and butyl alcohol; (3) carbohydrates to alcohol to acetone; (4) ethylene to alcohol to acetone; (5) propylene to isopropyl alcohol to acetone; and (6) acetylene to acetic acid (or acetaldehyde) to acetone. Barring depletion of most of the ultimate raw materials of the chemical industry (which include air, water, limestone, coal, petroleum, sulfur, salt and cellulose), it is hardly likely that a shortage of all liquids for a definite solvent purpose can occur. This is because of the diverse character of the products and the possibility of developing still others as need arises. A shortage of things to dissolve might occur before a shortage of liquids in which to dissolve them.

It is not the intention here to describe each solvent in terms of how it is made, its advantages and costs, because many of these liquids have uses other than as dissolvers. However, the principal classes are shown below with an indication of the particular fields in which they find usage as solvents.

Hydrocarbons

Mineral spirits and turpentine constitute the usual thinners for paints and varnishes. Coal-tar solvents are more active and are used in more difficultly soluble compositions and in varnish removers. Lacquers employ hydrocarbon liquids as diluents, generally coal-tar hydrocarbons. However, special cuts of petroleum naphtha are available from oil refineries which are comparable in evaporation rate with coal-tar hydrocarbons. Although petroleum naphtha usually has low solvent power on account of a high content of aliphatic hydrocarbons, petroleum solvents are now on the market which are high in aromatics and consequently high in solvent power. Such products are obtained by hydrogenation of naphtha or by taking special cuts from asphalt-base crudes. Hydrocarbons are the cheapest solvents and, of course, the most widely used. They are generally useful for oils, fats and waxes.

Naval stores liquids are principally hydrocarbons. Some (e.g., pine oil) contain other classes of compounds. They are included here because in solvent power they are more nearly like hydrocarbons.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity at 20°C.	Ref. Index (Pure Mat'l) 20°C.
Benzol (benzene)	78–81	59	.875–.886	1.5014
Toluol (toluene)	109–111	50	.866	1.4962
Xylol (xylene)	127–159	84	.862	1.500
Ethyl benzene	135	59	.872	1.4983
Cymene	176	212	.857	1.4947
Hi-flash naphtha	145–190	102	.860	1.4931
Petroleum naphtha	96–129	31	.735	.....
V M & P naphtha	160–200	120	.770	.....
Solvesso No. 1	94–139	45	.796	.....
Solvesso No. 2	134–185	110	.847	.....
Solvesso No. 3	179–214	155	.877	.....
Solvsol 19–27	88–132	...	.792(15°C.)	.....
Solvsol 24–34	115–171	...	.806(15°C.)	.....
Solvsol 30–40	148–204	...	.844(15°C.)	.....
Solvsol 40–50	204–260	...	.891(15°C.)	.....
Cyclohexane	80–83	43	.779	1.4273
Tetrahydronaphthalene (tetralin)	196–217	180	.972	1.5461
Decahydronaphthalene (decalin)	186–194	145	.885	1.4828
Turpentine	150–170	110	.866	1.469
Dipentene	150–175	145	.845–.854	1.474
Solvenol	165–212	110	.850–.866	1.474
Hercosol	175-262	150	.895–.905	1.473–1.480
Pine oil	99–226	185	.925–.935	1.479

Alcohols

Ethyl alcohol is undoubtedly the oldest solvent and has been used more often than any other liquid except water. It has long been a component of shellac coating compositions. In fact, shellac or other resin solutions used as coatings, are known as spirit varnishes. Methyl alcohol is also an old solvent. Fusel oil, a byproduct of alcohol fermentation, is a mixture of higher alcohols including amyl. These alcohols represent practically all that were commercially available until more recent years.

This group of solvents, perhaps more distinctly than any other, illustrates the changes produced by modern developments. Methyl alcohol is no longer dependent upon wood distillation. Neither must ethyl alcohol come entirely from fermentation since it can be made cheaply from ethylene. Fusel oil would not begin to supply the need for higher alcohols on which the lacquer industry relies. Isopropyl alcohol is produced by propylene hydration, and other higher alcohols are obtainable by hydration of the corresponding olefins. Normal butyl alcohol comes from a particular type of fermentation. The amyl alcohols now result from the chlorination and hydrolysis of pentane. Various of the higher alcohols are also available as by-products of the methanol synthesis. The commercial production of ethylene glycol is recent. Other alcohols can be produced as the need arises.

Although alcohols are largely utilized for production of esters, they have important uses in lacquers principally as blending agents. They also influence viscosity and clarity.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Methyl alcohol (methanol)	64–66	52	.795–.800	1.329
Ethyl alcohol	78	65	.791	1.361
Isopropyl alcohol (Petrohol)	82–83	67	.786	1.3776
n-Butyl alcohol (butanol)	115–118	111	.811	1.3974
sec.-Butyl alcohol	96–103	88	.808	1.397
tert.-Butyl alcohol	83	...	.781	1.3878
iso-Butyl alcohol	107–111	111	.803	1.396
n-Amyl alcohol	134–138	134	.82	1.3991
sec.-Butyl carbinol	126–130	135	.816	.....
Methyl propyl carbinol	117-121	121	.810	.....
iso-Butyl carbinol (iso-amyl alcohol)	128–132	132	.812	1.407
Diethyl carbinol (sec.-amyl)	117–124	124	.816	.....
tert.-Amyl alcohol	100–104	68	.81	.....
Fusel oil (refined)	100–132	108	.812–.816	.....
Amyl alcohol (mixed) (Pentasol)	112–139	126	.812–.820	1.4070
n-Hexyl alcohol	153–157	145	.819–.823	.....
2-Ethyl butyl alcohol	144–156	137	.830–.835	1.4229
Methyl amyl alcohol	131–132	114	.819–.823	1.4087
Octyl alcohol	182–201	178	.832–.837	1.4300
Cyclohexanol (Hexalin)	155–165	154	.945	1.4680
Methylcyclohexanol	170–180	154	.922	1.4635
Benzyl alcohol	199–204	204	1.045	1.5399
Diacetone alcohol	130–175	135	.937–.943	1.4242
Ethylene glycol	191–200	241	1.1150	1.4274

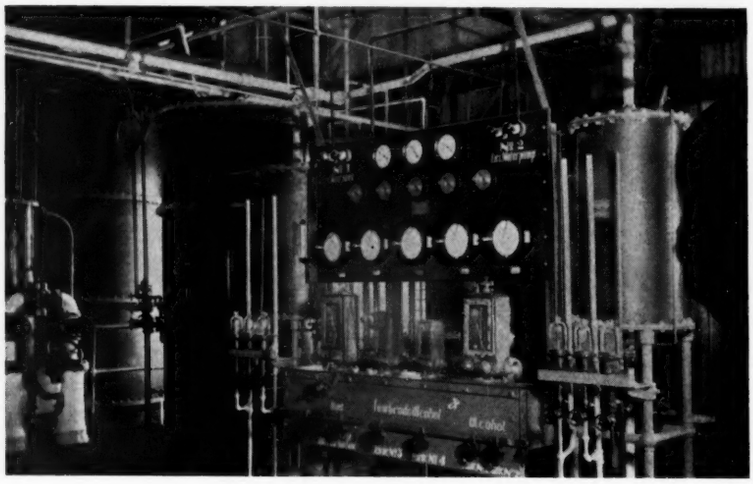
Esters

There are so many alcohols available and so many acids on a well established footing that the number of combinations is very great. This accounts for the largest group of individual solvents, the esters. The lacquer industry is the principal user. The cheapest organic acid is acetic, produced from several sources such as ethyl alcohol oxidation, oxidation of acetaldehyde obtained by hydration of acetylene, or wood distillation. Besides acetic acid others have long been available, such as formic, butyric, lactic, benzoic and oxalic, and esters of all these acids are produced. Another cheap acid is phthalic, but its esters are too high-boiling for consideration with volatile solvents and are discussed later as plasticizers. Aside from solvent power (highest in the esters of low molecular weight), evaporation rate is one of the chief points to consider in a lacquer solvent. Ethyl acetate and isopropyl acetate are the cheapest esters, but are so volatile that they produce difficulties of application when used in high proportion. The ester most widely in demand, therefore, is ethyl acetate. Other esters are used to meet particular requirements. In the cellulose acetate field ester solvents are represented by the lower formates and lactates.

In order to insure low acidity and prevent hydrolysis commercial esters frequently contain a certain amount of the alcohol from which they were made. This alcohol impurity is an advantage when a hydrocarbon is to be mixed with the ester solution in a lacquer, since a larger proportion of hydrocarbon can be added without precipitating the cellulose ester.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Ethyl formate	51–55	—3	.900–.930	1.3597
Butyl formate	95–110	...	.88(15°C.)	1.3891
Amyl formate	115–122	72	.87(15°C.)	1.3951(11°)
Methyl acetate	53–55	20	.930–.940	1.3619
Ethyl acetate	70–80	31	.883–.888	1.3727
Isopropyl acetate	84.5–90	35	.868–.874	1.3770
n-Butyl acetate	119–127	88	.872–.877	1.3951
sec.-Butyl acetate	105–127	88	.858	1.389
iso-Butyl acetate	114–118	88	.870	1.3997
Amyl acetate	110–150	84	.863–.871	.....
Methyl Amyl acetate	140–150	105	.8565	1.4008
sec.-Amyl acetate	120–152	89	.860–.865	1.4021
Amyl acetate (mixed isomers)	121–155	111	.860–.870	1.4000
Furfuryl acetate	175	...	1.1175	1.4603
sec.-Hexyl acetate	129–158	110	.861	.....
Methyl-iso-butyl carbinol acetate	140–150	113	.855–.860	1.4008
2-Ethylbutyl acetate	155–164	135	.875–.881	1.4103
Cyclohexyl acetate	170–177	135	.966	.....
Octyl acetate (2-ethylhexyl)	190–200	180	.870–.876	1.4300
Benzyl acetate	213–216	205	1.055	1.5232
Glycol monoacetate	182	215	1.108	.....
Glycol diacetate	190	207	1.104	1.4150
Methyl-butylene glycol acetate	167–171	140	.956	.....
Methyl Cellosolve acetate	143–145	132	1.003–1.008	1.4025
Cellosolve acetate	145–165	122	.971–.976	1.4030
Butyl Cellosolve acetate	188–192	180	.943	.....
Methyl Carbitol acetate	203–212	180	1.040	.....
Diethylene glycol diacetate	238–251	290	1.116	.....
Carbitol acetate	211–220	225	1.011	1.4230
Butyl Carbitol acetate	236–249	260	.987	.....
Methyl acetoacetate	90–90	180	1.0780	1.4246
Ethyl acetoacetate	180	141	1.022–1.027	1.4209
Ethyl propionate	90–118	70	.891	1.3844
Butyl propionate	124–171	105	.874	.....
Ethyl butyrate	107–131	85	.880	1.4008
Butyl butyrate	152–170	128	.874	1.4049
Ethyl benzoate	212	...	1.047	1.5068
Butyl glycollate	178–186	154	1.013	.....
Ethyl acetylglycollate	181–195	180	1.094	.....
Ethyl lactate	119–176	140	1.034	1.4118
Butyl lactate	145–230	176	.980	.....
Isoamyl propionate	150–160	145	.880	.....
Isopropyl lactate	149–167	130	.988	.....
Butyl crotonate	180	123	.899	1.4323
Methyl furoate	181	...	1.178	.....
Ethyl furoate	128 (95 mm.)	...	1.0974	1.4740
Butyl furoate	233–236	...	1.0555	.....
Amyl furoate	95–97 (7 mm.)	...	.....	.....
Diethyl carbonate (Diatol)	100–130	68	.967–.971	1.3845
Ethyl butyl carbonate	135–175	58	.92–.93	.....
Diethyl oxalate	180–190	168	1.075–1.079	1.4101
Diethyl succinate	217	...	1.040	1.4201
Diethyl malonate	198	...	1.061	1.4143

SOLVENTS *and* SOLVENT RECOVERY



It is only natural that industry when seeking to recover useful solvents should turn to those who are widely experienced in designing and building equipment to produce the original solvents.

The work done by Badger Engineers in these two important phases of chemical engineering has brought them in contact with the production of alcohols, esters, acetone, chlorinated solvents and synthetic organic chemicals. They have also been called in to help obtain highest recovery and quality of solvents used in the production of chemicals, lacquers, plastics, artificial leather, rayon, coated papers and synthetic products.

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As a class ethers are good solvents for oils and fats. Ethyl ether is the classical example of an extracting liquid, having been used widely in synthetic organic research. Mixed with alcohol, it formed one of the earliest nitrocellulose solvents. The higher ethers are usually effective solvents (except for nitrocellulose) and are often preferred on account of their lesser volatility. Of the recent ethers, dioxane is a very versatile solvent. It is a solvent for such unlike substances as chlorinated rubber and cellulose acetate. Glycol diethers are cellulose acetate solvents (dimethyl and diethyl Cellosolve are the dimethyl and diethyl ethers of ethylene glycol; dimethyl Carbitol is the dimethyl ether of diethylene glycol). Dichlordiethyl ether (Chlorex) is an example of a solvent which has attained wide specific use; it is employed in the improved purification of lubricating oils. Furfural (classed here as an ether for convenience) is also a cheap commercial product. Although it has wide uses otherwise, it is a good phenolic resin solvent and also finds application in lubricating oil extraction and in the purification of rosin.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Ethyl ether	34–37	—4	.715–.718	1.3542
Isopropyl ether	63–69	20	.723–.728	.....
Butyl ether	137–143	100	.756–.771	.....
Amyl ether	170–190	150	.780	1.4212
Dioxane	95–103	65	1.030–1.038	.....
Dimethyl Cellosolve	85	34	.878	1.3839
Diethyl Cellosolve	119–125	90	.849	.....
Diethyl Carbitol	181–189	170	.909	.....
Glycerol triethyl ether	181	...	.886(25°C.)	1.407
Epiethylin	124–126	...	.94	.....
Epiphenylin	130–132	...	1.11	.....
Dichlorethyl ether	172–178	...	1.217–1.223	1.4570
Furfural (not an ether)	158-162	131–134	1.158–1.160	1.5261

Ether-Alcohols

A particular group of solvents includes those which combine in a single molecule the characteristic groups of alcohols and ethers. A mixture of alcohol and ether is a good nitrocellulose solvent; the ether-alcohols such as glycol ethers are even better. Perhaps the most outstanding property of the glycol ethers is their very mild odor. Cellosolve is the ethyl ether of ethylene glycol; methyl Cellosolve is the methyl ether and butyl Cellosolve, the butyl ether of glycol. Carbitol is the ethyl ether of diethylene glycol. These liquids are also solvents for many dyes, and Carbitol finds use as an ingredient of non-grain-raising wood stains. This group of solvents has been largely developed since the rise of automobile lacquers. Glycol ethers are economically produced from ethylene, which is present in the gases from the cracking of petroleum. The glycerol ethers are less available but should also be considered.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Methyl Cellosolve	118–126	105	.961–.966	1.4028
Cellosolve	133–137	111	.927–.933	1.4080
Isopropyl Cellosolve	140–143	125	.906	.....
Butyl Cellosolve	163–172	165	.900–.905	1.4190
Benzyl Cellosolve	254–258	254	1.070	.....
Methyl Carbitol	185–195	200	1.030–1.040	1.4244
Carbitol	189–203	205	1.024–1.030	.....
Butyl Carbitol	224–232	230	.954–.960	1.4290
Ethylidene glycerol	180–197	...	1.131(25°C.)	1.1442(25°)
Glycerol monoethyl ether	222	...	1.063(25°C.)	1.441
Glycerol diethyl ether	191	...	.952	1.419(23°)
Glycerol diisopropyl ether	199	...	.914	1.418(25°)
Glycerol monoisoamyl ether	254	...	.976(25°C.)	1.440(25°)
Glycerol diisoamyl ether	265	...	.901(25°C.)	1.431(25°)
Furfuryl alcohol	169	167	1.133	1.4870
Tetrahydrofurfuryl alcohol	170–178	167	1.055	1.4519

Ketones

Wood distillation yields acetic acid which, when converted to calcium acetate and distilled, gives acetone. Higher ketones are formed at the same time, methyl ethyl ketone and a higher boiling mixture known as acetone oil. A particular solvent product is known as methyl acetone, which consists of a mixture of methyl alcohol, methyl acetate and acetone. These solvents have long been known and used for many purposes. Acetone is one of the strongest solvents for cellulose esters and a great many resins. An early use of acetone was as a solvent for acetylene. As mentioned previously, the present process for getting acetone is by fermentation, whereby butyl alcohol is also obtained. It is also available by dehydrogenation of isopropyl alcohol. The higher ketones, which are particularly useful with vinyl resins, are also made synthetically. Cyclohexanone is an excellent lacquer solvent.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Acetone	55.7–56.7	0	.7915–.7935	1.3591
Methyl acetone	54–70	23	.829–.839	.....
Methyl ethyl ketone	77–82	32	.805	1.3791
Methyl propyl ketone	101–107	60	.810	1.3895
Methyl isobutyl ketone (Hexone)	113–119	74	.799–.804	1.3959
Methyl n-butyl ketone	114–137	95	.818	1.4024
Methyl n-amyl ketone	147–153	115	.816–.821	1.4110
Methyl n-hexyl ketone	169–173	160	.820	1.4161
Diethyl ketone	100–104	59	.815	1.3927
Dipropyl ketone	138–144	120	.816	1.4072
Diisobutyl ketone	164–169	145	.808	.....
Mesityl oxide	117–139	90	.855	1.4439
Cyclohexanone	130–173	145	.946	1.4524
Methylcyclohexanone	114–173	145	.921	.....
Fenchone	190–210	160	.948	1.4647

Chlorinated Compounds

The non-flammability of many chlorinated hydrocarbons makes them very useful where fire hazards are concerned, as in certain coating compositions and in dry cleaning, degreasing and oil extraction. As solvents for oils, fats, and many resins they are quite effective;

Solvents

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and in combination with alcohols a more active solvent is often obtained. For example, ethylene dichloride and alcohol is a solvent for nitrocellulose and cellulose acetate. Acetylene tetrachloride is a good cellulose acetate solvent and was formerly widely used for this purpose, but is less popular now on account of its toxicity. Butyl and amyl chlorides are available, but are used more for synthesis than as solvents. The same is true of the chlorhydrins of glycol and glycerol.

Name	Boiling Range °C.	Flash Point °F.	Specific Gravity 20°C.	Ref. Index (Pure Mat'l) 20°C.
Methylene chloride ..	40–42	Non-infl.	1.328	1.4235
Chloroform	61.2	Non-infl.	1.499(15°)	1.4449
Carbon tetrachloride.	76	Non-infl.	1.584(25°)	1.4607
Ethylene dichloride..	82–84	70	1.23–1.25	1.4446
Trichlorethane	114	...	1.478	1.4709
Tetrachlorethane ...	145–147	Non-infl.	1.600	1.4509
Pentachlorethane ...	157–160	Non-infl.	1.680	1.5020
Trichlorethylene	86–88	Non-infl.	1.472	1.4777
Tetrachlorethylene ..	119	Non-infl.	1.624	1.5050
Propylene dichloride.	93–97	...	1.158	1.4388
Dichlorpentane	130–200	...	1.035	.....
Ethylene chlorhydrin.	122–132	131	1.202–1.208	1.361
Dichlorhydrin	170–190	...	1.351	1.4802
Epichlorhydrin	117	...	1.203	1.442
Chlorbenzene	130–131	83	1.104	1.5248
Dichlorbenzene (Orthene)	167–180	120	1.336	1.5518
Trichlorbenzene	123	217	1.466(10°)	.....

Plasticizers

Solvents usually imply more or less readily volatile liquids. Plasticizers are preferably non-volatile and represent the highest available homologs of the solvent series. The previous remarks as to the availability and recent extensive growth of solvents apply also to these materials, which are additions made to plastic substances to modify their physical properties. Their two principal requirements are miscibility or compatibility and the permanency of their toughening or flexibilizing effect.

Plasticizers may be either liquid or solid. Castor oil was used as early as 1856 in the so-called flexible collodion. The next advance was camphor as used with nitrocellulose to form Celluloid. Camphor is appreciably volatile, and many attempts were made to find a camphor substitute. Although many substances were suggested, few were chosen; and camphor remains unique in being a volatile substance which sticks with the composition in mass. This permanency may be due to compound formation or to the mechanical action of volatilizing from the surface layer to produce a shrinkage and consequently a sealing in of the material underneath. Somewhat later the aryl phosphates were introduced, one expectancy from their use being the reduction of flammability. Tricresyl phosphate was developed for this purpose. Alkyl phthalates were also tried as well as hundreds of other substances.

With the advent of modern lacquers the need for plasticizers to reduce the hardness and brittleness of nitrocellulose and increase its flexibility and adhesion was apparent. Camphor is suitable for nitrocellulose in massive form, but a lacquer film is mainly surface, and camphor is lost rather quickly. On the other hand, dibutyl phthalate, tricresyl phosphate and castor oil, either alone or in mixture, while not the most useful for solid substances, were utilized, and today remain the most widely used plasticizers for lacquers, although there are a great many from which to choose.

Triphenyl phosphate and the alkyl phosphates are miscible with cellulose acetate as well as with nitrocellulose. Many phosphates have been introduced recently which differ among themselves in solvent power and volatility. They are valuable also in cellulose ether compositions. The alkyl phthalates represent another large group. The lower phthalates (ethyl and methyl) are miscible with cellulose acetate and are widely used in cellulose acetate plastics, whereas the higher phthalates are preferred in nitrocellulose lacquers. The softer alkyd products may be considered as plasticizers as well as resins. Various modifications of castor oil and castor oil derivatives have been developed; also other modified oils.

Most plasticizers are esters, and a distinction is sometimes made between glyceride oils or oil derivatives and synthetic materials, the latter being termed chemical plasticizers. With nitrocellulose they differ in type of miscibility. For example, nitrocellulose is not directly soluble in castor oil, but it is in dibutyl phthalate. Both kinds of plasticizers yield clear solid solutions with nitrocellulose.

Although the chief requirements of a plasticizer are miscibility and permanence, there are other factors. Permanence depends on vapor pressure and stability. The substance should not only be very high-boiling but also should not decompose on aging into volatile bodies. There should be no color change by light. Odor would be expected to be very slight since this is usually associated with more volatile materials. A plasticizer should not ordinarily be water-soluble. And, finally, the effect should be that of toughening (preferably on addition of a relatively small amount of the plasticizer) and not simply softening. Although materials of such intrinsic hardness and toughness as cellulose esters can stand some softening by the addition of a miscible substance, this is not generally true of brittle resins.

Phosphate Plasticizers

Name	Boiling Point, °C./mm.
Tributyl	180/20
Triamyl	225/50
Triphenyl	260/20
Tricresyl	275–280/20
Diphenyl-tert.-butylphenyl	261/6
Diphenyl-chlorphenyl	236/4
Diphenyl-xenyl	280/7.6
Phenyl-di-tert.-butylphenyl	281/6
Phenyl-dichlorphenyl	254/4
Phenyl-dixenyl	275/.5

Phthalates

Name	Boiling Point, °C./mm.
Dimethyl	280–290/760
Diethyl	200–207/50
Dibutyl	195–200/5
Diisobutyl	305/15
Diamyl	210–220/20
Dibenzyl	328/35
Butyl benzyl	202–288/20
Diphenyl	250–257/14
Methyl Cellosolve	209–261/20
Cellosolve	345/760
Butyl Cellosolve	233/5
Diethyl (tetrahydro)	160–165/10
Dibutyl (tetrahydro)	185–190/10

Vegetable Oils and Fatty Acid Derivatives

Name	Boiling Range, °C./mm.
Castor oil	
Ethyl ricinoleate	258/13
Butyl ricinoleate	275/13
Butyl acetylricinoleate	200–235/3
Butyl stearate	200–225/25
Amyl stearate	230–270/30
Butyl oleate	357–370/760
Amyl oleate	200–240/20
Amyl laurate	290–365/760
Triacetin	258–760
Tributyrin	310/760
Linseed oil	
Soya bean oil	
Tung oil	

Other Ester Plasticizers

Name	Boiling Point, °C./mm.
Tartrates:	
Diethyl	340/760
Dibutyl	300/760
Diisobutyl	300/760
Diamyl	dec.
Dibenzyl	250–270/4
Citrates:	
Triethyl	294/760
Tributyl	233/22.5
Triamyl	dec.
Glycollates:	
Methyl phthalyl ethyl	189/5
Ethyl phthalyl ethyl	190/5
Butyl phthalyl butyl	219/5
Lactate:	
Amyl	75–150/20
Carbonates:	
Diphenyl	302/760
Oxalates:	
Dibutyl	243/760
Diisobutyl	229
Diamyl	135–155/20
Dicyclohexyl	220/20
Di-methylcyclohexyl	190–200/10
Succinates:	
Dibutyl	274/760
Dibenzyl	238/14
Maleate:	
Diamyl	130–145/2
Adipates:	
Diethyl	245/760
Diamyl	309/760
Dicyclohexyl	212/12
Di(Methylcyclohexyl)	226–232/12
Sebacates:	
Diethyl	307–308/760
Dibutyl	180–220/5
Benzoates:	
Butyl	237/760
Amyl	216–265/760
Benzyl	340–350/760
Ethylene glycol	360/760
Benzoylbenzoates:	
Methyl	340/760
Ethyl	355/760
Salicylates:	
Butyl	263/760
Amyl	272/760
Benzyl	208/26
Cinnamates:	
Methyl	268/760
Ethyl	271/760
Butyl	165/17
Abietates:	
Methyl	360–370/760
Ethyl	350/760
Benzyl	294–297/4
Methyl (hydro)	365/85
Borates:	
Triamyl	220–280/760

Although most plasticizers are esters, there are some of different type, such as derivatives of toluenesulfonamide, anilides, substituted ureas and high molecular ketones and esters.

Road Oil Sales Up in '37

Increased construction of the lighter types of highway, especially for county and farm-to-market roads, resulted in an increase of six per cent. in the sales of road oil by petroleum refineries in the U. S.—from 8,256,694 barrels in '36 to 8,733,650 barrels in '37, according to statistics compiled by the Bureau of Mines, Department of the Interior. However, if the sales of road oil are taken in connection with sales of cut-back asphalts, paving flux, and emulsified asphalts, a smaller proportionate increase (three per cent.) was registered in the total sales of liquid and semi-liquid asphalts for highway construction—from 16,427,254 barrels (revised figure) in '36 to 16,968,641 barrels in '37.

Increases in the Rocky Mountain district, where sales of road oil were almost doubled from '36 to '37, in California, and in the Louisiana Gulf Coast more than offset a considerable decrease in Texas and in northern Louisiana and Arkansas, and smaller proportional decreases in the Oklahoma-Kansas-Missouri district, and in the districts east of the Mississippi River.

Of the road oil sold in the U. S. in '37 only 594,812 barrels, valued at $990,951, were made from foreign petroleum imported from Venezuela and Mexico. Of the road oil made from foreign crude, 79 per cent. was sold by refineries of the Atlantic seaboard in '36 and 77 per cent. in '37; the remainder was made in Gulf Coast refineries of Louisiana and Texas.

Petroleum refineries in the U. S. reported the production of 8,087,231 barrels of road oil in '37, compared with 7,397,868 barrels of road oil in '36. The refinery output of road oil was augmented in '37 by 1,089,167 barrels of other petroleum products, chiefly fuel oil, transferred to road oil stocks, compared with 1,096,583 barrels similarly transferred in '36. Stocks of road oil and of transferred oils held at refineries increased from 856,039 barrels (revised figure) on December 31, '36 to 983,843 barrels on December 31, '37.

PHOSPHORIC ACID

85% USP SYRUPY

Made from pure Elemental Phosphorus of our own production. Meets all USP and U. S. Pure Food Law requirements. Special corrosion-resistant equipment for handling and storage maintains purity to delivery. Prompt service from convenient shipping points.

"AA QUALITY" CHEMICAL PRODUCTS

Monocalcium Phosphate	Carbonate of Ammonia	Sulphuric Acid
Dicalcium Phosphate	Bone Black Pigments	Gelatins
Disodium Phosphate	Sodium Silicofluoride	Phosphorus
Trisodium Phosphate	Sod. Acid Pyro Phosphate	Phosphoric Acid

The AMERICAN AGRICULTURAL CHEMICAL Co.

50 Church Street, New York

33 Offices in Principal Cities in U. S., Cuba and Canada

RESIN and LACQUER PRODUCERS

IMPROVE YOUR RESINS BY USING "NATIONAL ANILINE"

TOXILIC (MALEIC) ANHYDRIDE—A uniform, white, chemically pure product of increasing importance as a raw material to producers of *quality resins and plasticizers.*

CHEMICAL SPECIFICATIONS

MOLECULAR WEIGHT	98
DENSITY	1.42 at 28° C
MELTING POINT	52.6° C
BOILING POINT	202° C

SOLUBILITY — Readily soluble in benzene, hydro-carbons, acetone, ethyl ether and chloroform.

PHTHALIC ANHYDRIDE—A standardized, pure white, flake product from production sources adequate to meet your every demand.

OTHER RELATED CHEMICALS—In addition, the following chemicals are now available in commercial quantities: Succinic Acid and Anhydride • Malic Acid • Fumaric Acid • Toxilic (Maleic) Acid.

NATIONAL ANILINE AND CHEMICAL COMPANY, INC.

Intermediates Division — BOwling Green 9-2240

40 RECTOR STREET — NEW YORK, N. Y.

BOSTON	150 Causeway St.	CHARLOTTE	201-203 W. First St.
PROVIDENCE	15 Westminster St.	GREENSBORO	Jefferson Standard Bldg.
CHICAGO	357 W. Erie St.	ATLANTA	140 Peachtree St.
PHILADELPHIA	200-204 S. Front St.	CHATTANOOGA	James Bldg.
SAN FRANCISCO	517 Howard St.	PORTLAND, ORE.	646 N. Thompson St.

TORONTO . 137-145 Wellington St., West

BRANCHES AND DISTRIBUTORS THROUGHOUT THE WORLD

New Products from Chemicals

Lucite invades the costume jewelry field. The use of du Pont's new methyl methyacrylate, crystal-clear plastic in the manufacture of these Crystal Gazer lockets represents another advance in the adoption of new material made available by chemistry, at a fraction of the cost of Nature's material. The lockets can be opened to change the photographs which show clearly through the plastic.

Time for the next dose! The Hour Cap, a novel closure produced in a variety of Bakelite molded colors, contains raised numerals on the top to designate the hours of the day. A tiny steel bearing inserted in a ribbed groove may be moved to the hour or one-half hour when the next dose should be taken.

Many outstanding features are claimed for this new line of porous ceramic diaphragms for electrolytic cells manufactured by The Carborundum Company, Niagara Falls, N. Y., and called "Alfrax."

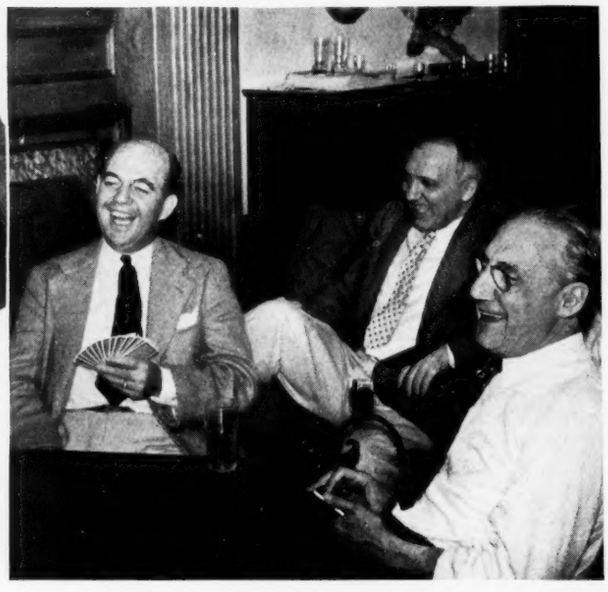
Business and Pleasure

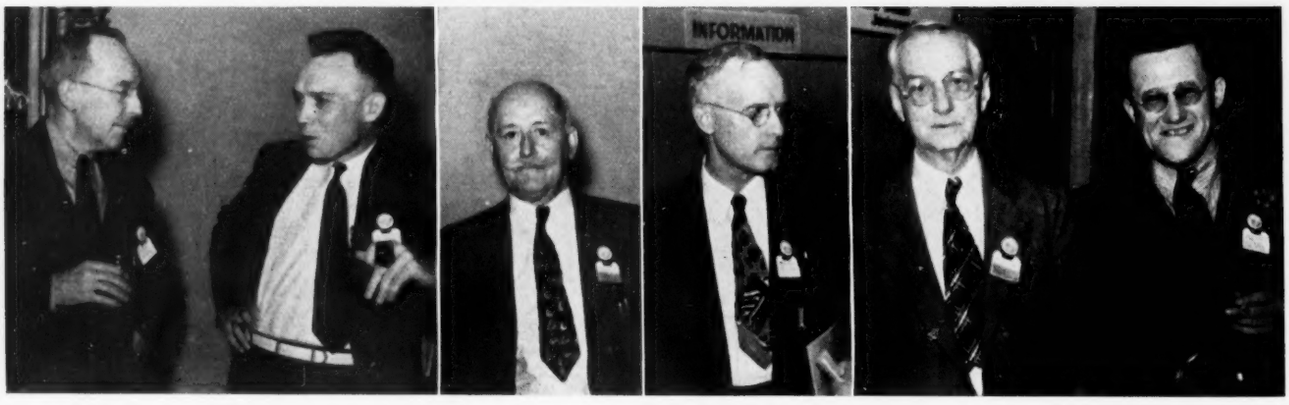
Making a business of pleasure—left to right, Frank D. Goll (Aluminum Co.), H. B. Prior (Prior Chemical), Dr. N. E. Van Stone (Sherwin-Williams) and Dr. J. D. Kerr (Glidden Co.).

Harold Fyffe (Oldbury) mixes both—Cameraman, Don Prior.

Pure pleasure—left to right, H. B. Prior, Dr. Kerr, and Eli Winkler (Columbia Alkali).

Pleasuremasters Charles Kelly (Hagerty Bros.), president, and Bart Sheehan (du Pont), chairman, entertainment committee, of the Salesmen's Association—Cameraman, Don Prior.





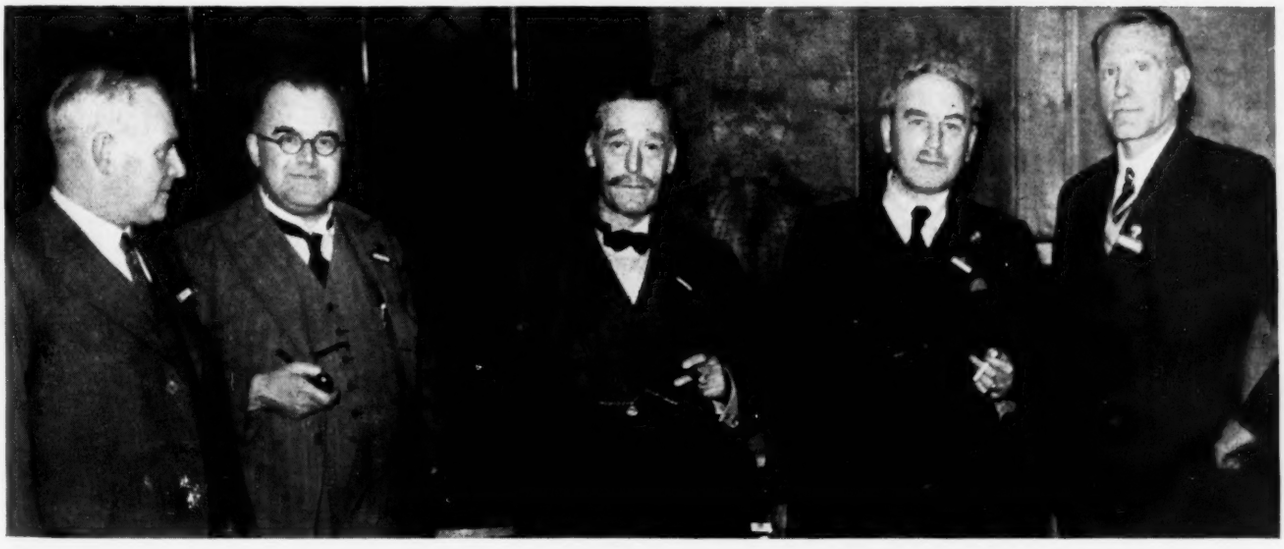
Candid Cameraman E. L. Luaces, N. Y. City consultant, shot these celebrities at the recent American Water Works convention in New Orleans—left to right, W. M. Wallace, Detroit Purification Plant, chairman, Purification Division, A. W. W. A.; N. M. Jarnette, chemist, Georgia State Dept. Health; Col. J. Wrench, sales manager, Industrial Sales Division, West Virginia Pulp & Paper Co.; John R. Baylis, physical chemist, Experimental Water Filtration Plant, Chicago; Vic Arnold, president, Phoenix Meter Co., Staten Island, and M. M. Braidech, asst. prof., chemical engineering, Case School of Applied Science.

Names in the News

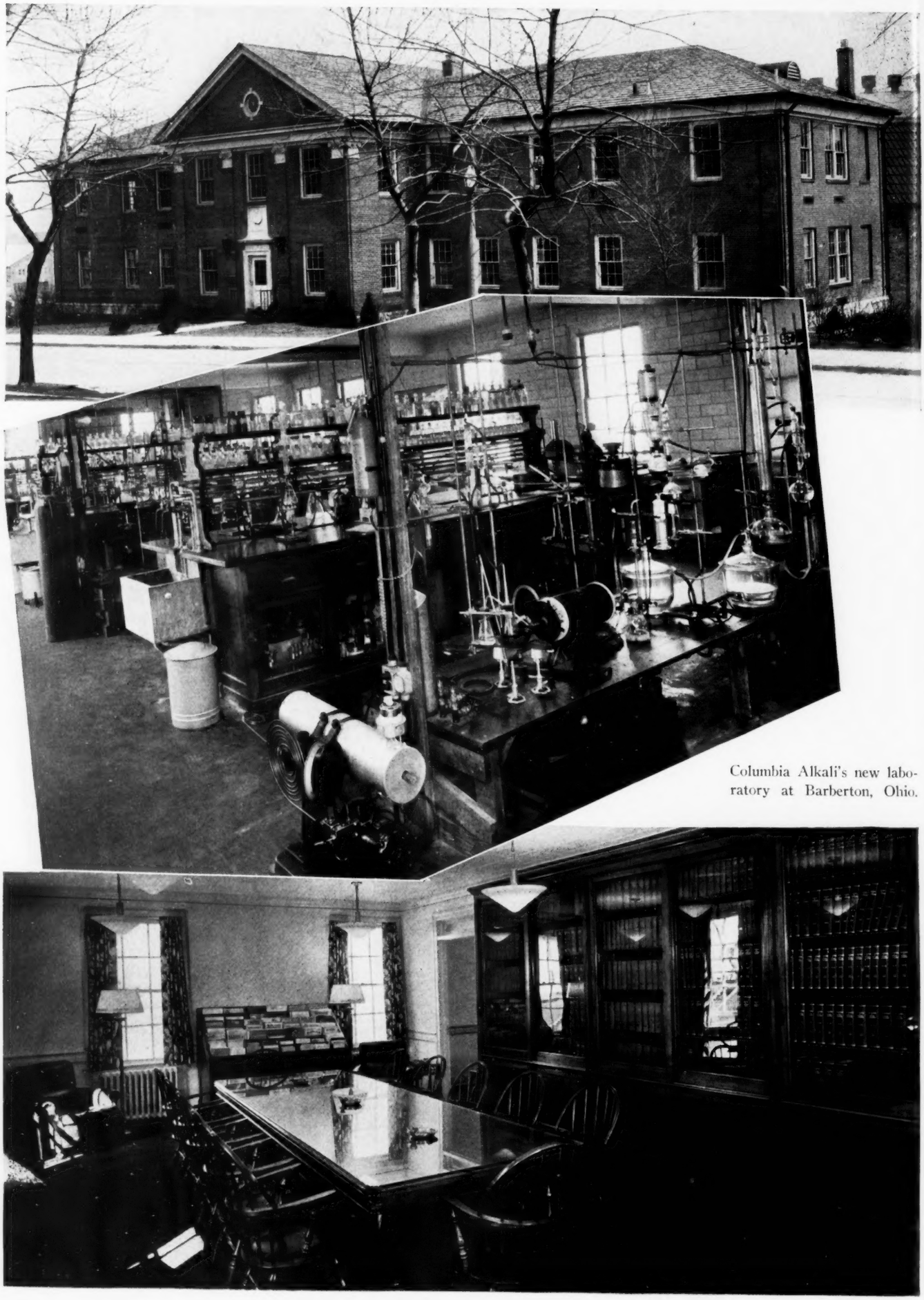
Francis J. Gorrell of the clerical staff of the Henry Bower Chemical Mfg. Co., Phila., Pa., retires after fifty-three and one-half years of loyal service. Mr. Gorrell, born on February 20, 1869, was taken on as an office boy by the old Kalion Chemical Company, manufacturer of bichromates, in 1885, just about the same time that William H. Bower became associated with Kalion. The Kalion Chemical Company was eventually bought by the Baltimore Chrome Works which is now the Baltimore plant of the Mutual Chemical Co. of America. Later Kalion was combined with the Ammonia Co. of Philadelphia, to form the Henry Bower Chemical Mfg. Co. Mr. Gorrell's first salary was $3.50 a week, and he worked from 6.45 A. M. to 6.00 P. M. During the blizzard of '88 he remembers that he was only able to get to work by obtaining a lift on an ice-wagon. Possibly this was the beginning of the intimate association of the Bower organization with the ice manufacturers whom it has served so faithfully for many years. In these days of forty hour and less work weeks, when the pitchers only go half a ball game, and in the welter of the discussion surrounding "the more abundant life," Mr. Gorrell shows no signs of unusual wear and tear for his fifty-three and one-half years of devoted service.

John M. Weiss and bride caught lunching at the Chemists' Club, New York, by Cameraman E. L. Luaces.

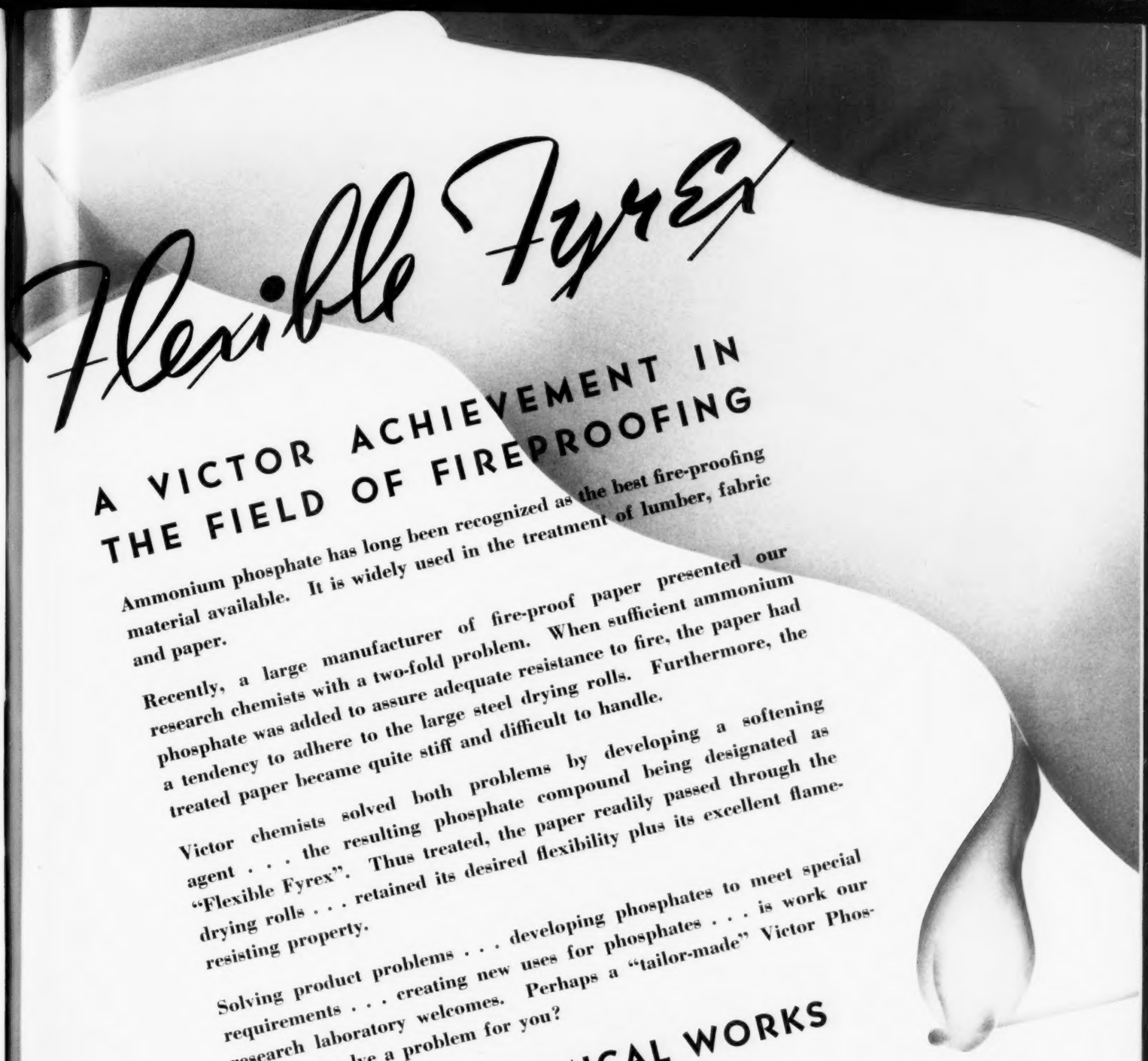
Fred Koch (Dow Chemical) opens the Fall selling season prematurely—Cameraman, Donald D. Bradley (Rolls Chemical).



The British Government delegation which accompanied seventy-five members of the Society of Chemical Industry to Canada for the fifty-seventh annual meeting, was snapped in the lounge of the *Duchess of Atholl*, before they reached Quebec, with the Society's secretary, H. J. Pooley (extreme left). The delegation comprised (l. to r.) Dr. R. E. Stradling, director, Building Research Station; Sir Gilbert Morgan, director, Chemical Research Laboratory; Dr. J. J. Fox, chief chemist, British Government, and W. A. Damon, chief inspector, Alkali Works.



Columbia Alkali's new laboratory at Barberton, Ohio.



Flexible Fyrex

A VICTOR ACHIEVEMENT IN THE FIELD OF FIREPROOFING

Ammonium phosphate has long been recognized as the best fire-proofing material available. It is widely used in the treatment of lumber, fabric and paper.

Recently, a large manufacturer of fire-proof paper presented our research chemists with a two-fold problem. When sufficient ammonium phosphate was added to assure adequate resistance to fire, the paper had a tendency to adhere to the large steel drying rolls. Furthermore, the treated paper became quite stiff and difficult to handle.

Victor chemists solved both problems by developing a softening agent . . . the resulting phosphate compound being designated as "Flexible Fyrex". Thus treated, the paper readily passed through the drying rolls . . . retained its desired flexibility plus its excellent flame-resisting property.

Solving product problems . . . developing phosphates to meet special requirements . . . creating new uses for phosphates . . . is work our research laboratory welcomes. Perhaps a "tailor-made" Victor Phosphate will solve a problem for you?

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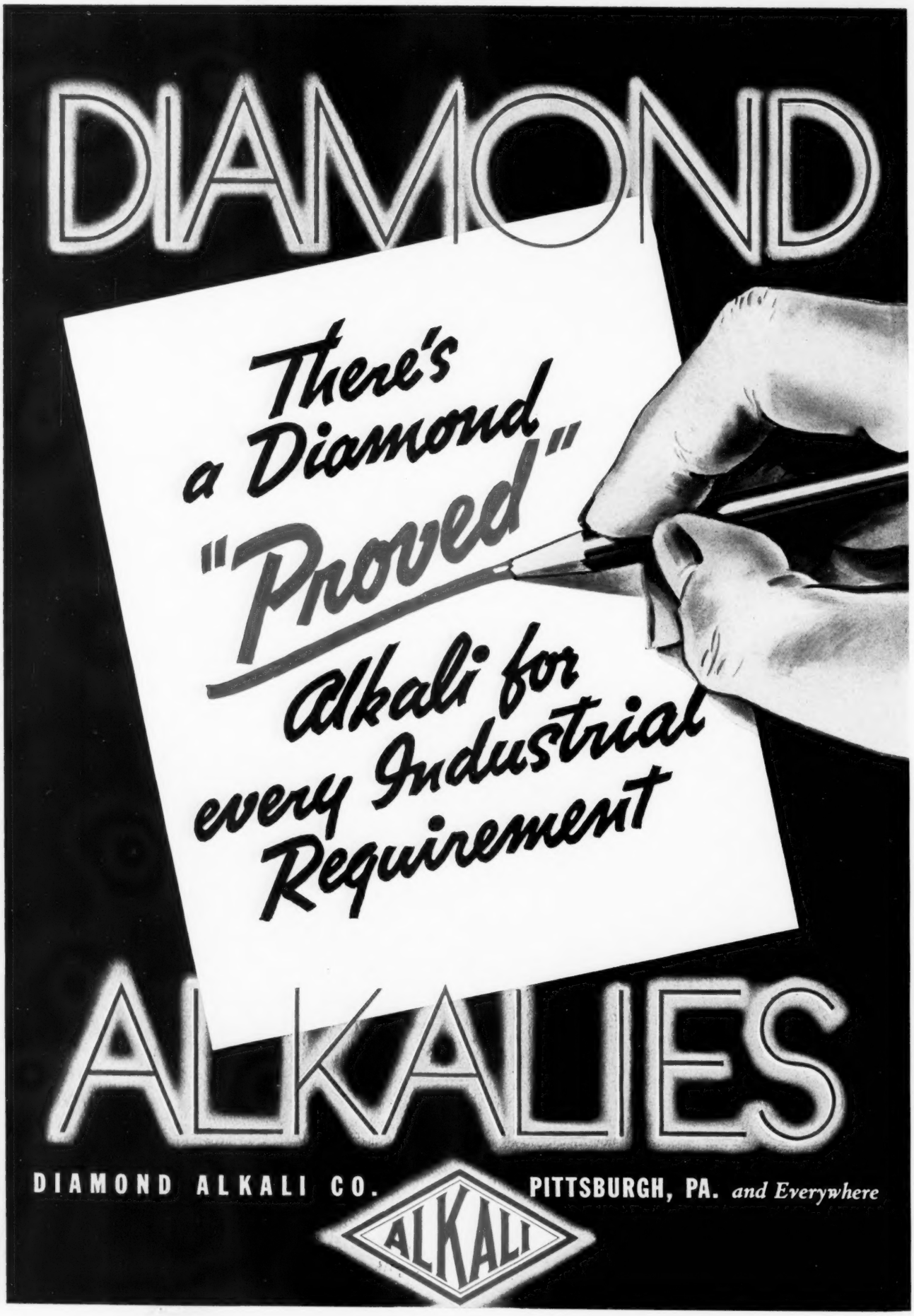
FAMOUS FOR PHOSPHATES

VICTOR

HEADQUARTERS FOR PHOSPHORUS . . . . PHOSPHORIC ACID AND PHOSPHATES OF ALL KINDS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There's a Diamond "Proved"
Alkali for every Industrial Requirement
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ALKALI

Plant Operation and Management

A digest of new methods and plant equipment

Hydrochloric Acid Corrosion

By Dr. E. Rabald

IN most cases, dry hydrogen chloride gas at temperatures of 200° C. has very little influence on iron apparatus; and it is usual practice to use cast-iron piping for the cooling to about 130° C. of the gases containing up to 25 per cent. of hydrogen chloride produced in salt cake furnaces. For the combustion of chlorine with hydrogen, burners of copper and its alloys are used.

An interesting observation made by Hofmann and his collaborators is that the vapors of ammonium chloride at 250-300° C. attack metals far more strongly than would the quantity of hydrogen chloride produced by the dissociation of the ammonium chloride have done if present alone. In the case of iron, the attack, under these circumstances, is five times as great; with nickel and silver, forty times as great; and with copper, 100 times as great, although in the last-mentioned connection the presence of ammonia also has an influence. In the presence of water, however, conditions are quite different. For instance, copper is strongly attacked by hydrogen chloride in a pressure tube at 200° C., but is practically unattacked under the same conditions by ammonium chloride solution.

With hydrochloric-acid solutions, the corrosion problem is far more troublesome. When these solutions contain comparatively small quantities of water, the difficulties are not great: for instance, cast iron stands up well enough to such processes as the decomposition of chloride with hot concentrated sulfuric acid, and the chlorination of hydrocarbons. Iron vessels have been, and are being, satisfactorily employed in the conversion of acetanilide into acetylsulfanilic acid chloride; and in the production of toluene sulfochloride from toluene and chlorosulfonic acid for use in saccharin manufacture, provided the temperatures are maintained from —5° to —8° C. The decomposition of the excess of chlorosulfonic acid with ice should, however, if effected in metal equipment, be conducted in hard lead vessels to avoid the formation of products strongly contaminated by iron.

The chlorination of toluene to benzyl chloride and benzal chloride, in the presence of a carrier such as phosphorus trichloride, is mainly effected in homogeneous lead-lined vessels. It has been noted, however, that when putting new plant into commission, a certain amount of the toluene is chlorinated in the nucleus, but this nuclear chlorination can be avoided by a preliminary treatment of the equipment with sulfur chloride (liquid or vapor).

The corrosion of soft lead by hydrochloric-acid solution increases both with the concentration of the solution and the degree of agitation to which the solution is subjected. Where the use of lead is on this ground ruled out, welded-nickel equipment can be usefully employed. A point of practical importance is the advisability, when such nickel equipment is temporarily shut down, of removing any traces of hydrogen chloride by thoroughly drying out with dry air or dry nitrogen. A similar precaution is recommended in condensations with aluminum chloride in the Friedel and Crafts' synthetic methods, when these methods are worked in iron equipment. In the condensation of phenols with aldehydes in the synthetic-resin industry, when hydrochloric acid is used as a catalyst, it has been found that better products are obtained when working in tin or nickel vessels and when operating in lead-lined equipment. Even in the presence of water, tin and nickel are more stable to low concentrations of the acid than is lead.

In the case of hydrochloric-acid solutions containing more than a slight quantity of water, the influence on the corrosion behavior of the acid of the impurities present in the technical material is of paramount importance. Acid manufactured from salt and sulfuric acid contains as impurities sulfuric acid, iron salts, arsenic and selenium compounds, and possibly free chlorine, though synthetic hydrochloric acid is free from these impurities. The free chlorine and the iron chloride have the most pronounced influence on the corrosive properties of the commercial hydrochloric acid. For instance, lead treated with a 30 per cent. solution of pure hydrochloric acid at room temperature showed a decrease in weight of 78 grams per square meter per day. The same experiment repeated with a commercial acid containing 0.5 to 0.8 per cent. of chlorine showed a loss in weight of 177 grams per square meter per day; and when the acid contained 1 per cent. of iron chloride, the comparable weight loss figure was 401 grams. The influence of these impurities is equally manifest with the more resistant metals such as Monel and the various special steels.

The influence of the presence of atmospheric oxygen on other oxidizing agents in hydrochloric-acid corrosion is also far-reaching. The addition, for instance, of 30 per cent. hydrogen peroxide to hydrochloric acid of density 1.125 means that the material is capable of strongly attacking bismuth, antimony, gold and platinum. The use of agents such as quinoidine as restrainers of corrosion by hydrochloric acid in metal pickling is well known. This method has also been employed in chemical manufacture. For instance, the addition of quinoidine has been made in the preparation of dichlorethyl ether by the passage of hydrogen chloride through acetaldehyde or paraldehyde. Quinoidine seems to be the most efficient protective agent, particularly when using alcoholic hydrogen chloride solutions in the presence of copper, although its efficiency is not so great in the case of lead.

* From paper presented to a meeting of the "Dechema" and other organizations, held in Berlin on April 28, 1938. Published in "Die Chemische Fabrik," June 8, abstracted from "Chemical Trade Journal," June 24.

Production Isopropyl Acetate

Isopropyl acetate is produced by reacting isopropyl sulfuric acid with aqueous acetic acid and then distilling off the isopropyl acetate under a pressure below 600 mm. The reaction may be effected with acetic acid of 60-80 per cent. at 50-120° C., and the ester may be distilled off at 3-300 mm. pressure. In an example, a mixture of isopropyl sulfuric acid and 80 per cent. acetic acid is led through a reaction chamber at 80° C. and a column provided with filler bodies, the still being kept at 200° C. and 300 mm. pressure. The distillate is rectified to separate an azeotropic mixture of isopropyl acetate and water from acetic acid (E. P. 478,073, *Chemical Trade Journal*, May 27, '38, p.456).

Cathodic reduction of lactic acid yields a mixture of ethyl alcohol and formic acid in stoichiometric proportions (E. Baur, *Z. Elektrochem., 43*, 821).

Concentrated Solutions Alkali Bisulfites

Production, without recourse to evaporation, of concentrated solutions of sodium or potassium bisulfite, is the subject of E. P. 484,254, mentioned in *Chemical Trade Journal*, June 10, '38, p. 486. For certain uses concentrated solutions of sodium bisulfite are prepared by saturating solutions of soda with sulfur dioxide. Owing to the comparatively high price of soda, many attempts have been made to substitute this by a considerably cheaper mixture of sodium sulfate and limestone or hydrated lime. The object of this method is to precipitate calcium sulfate from such a mixture and to form at the same time sodium carbonate or sodium hydroxide which reacts with sulfur dioxide to produce the bisulfite.

A method of producing a solution of sodium bisulfite is also known, in which sodium sulfate acts upon a solution of calcium bisulfite. Owing to the considerably greater solubility of calcium bisulfite in water compared with that of calcium carbonate or calcium hydroxide, the calcium content may be precipitated in the form of calcium sulfate. For certain purposes a large content of sodium sulfate in the sodium bisulfite solution is undesirable, but a certain amount of calcium bisulfite is tolerable; it would appear, therefore, to be advantageous to introduce the sodium sulfate in a quantity less than that corresponding to the stoichiometrical proportion. An important defect of this process also, according to the specification, is the small concentration of the sodium bisulfite solution, corresponding in this case to the solubility of calcium bisulfite in water.

Present invention aims at providing a process for the production of a concentrated solution of sodium bisulfite from sodium sulfate, limestone or lime, sulfur dioxide and water, which contains only a slight quantity of sodium sulfate, without the necessity of evaporating water from the solution. The concentration may be as much as 40 per cent. by weight.

Industrial Water Methods

Steadily growing interest in connection with water for industrial uses was the subject of one complete session of the annual meeting of the American Society For Testing Materials. This committee presented seven proposed methods, the first covering the sampling of plant or confined waters for industrial uses.

An indirect method for estimating sodium in water supplies was described by Messrs. Romer, Cerna and Hannum (Babcock & Wilcox Co.). Method is based on the principle that all inorganic basic ions present in the solids obtained on evaporating the water sample to dryness are converted, by controlled fuming with sulfuric acid, to either sulfates or oxides.

With the exception of sodium, potassium, and lithium, all of the anions present after this treatment can be readily and accurately determined by standard quantitative methods. With this data available it is possible to estimate, by simple calculations, the amount of sodium present. A series of samples was prepared by dissolving in distilled water various amounts of those compounds common to industrial waters. These samples were analyzed and the results show that sodium is quite accurately determined by this method.

It was suggested that method should possibly be considered as adaptable for the sum of sodium and potassium in raw or natural waters.

P. G. Bird (National Aluminate Corp.) discussed the newer organic types of exchanger bodies as applied to water treatment for complete or partial removal of dissolved salts, this use of exchange filters being a relatively new practice. To effect practically complete removal of dissolved salts from water, the water is passed through two filter beds arranged in series. The first bed, known as the "cation exchanger bed," removes the positive ions, or cations such as those of calcium, magnesium, and sodium. The second bed removes the negative ions, or anions, such as the chlorides, sulfates, and nitrates and is referred to as an "anion exchanger bed." The carbonate ions, or CO_2, which enter the system as bound CO_2 in the carbonates and bicarbonates of the raw water, are not removed in either bed, but are released by aeration after the water has passed through the system.

Messrs. Straub and Bradbury (University of Illinois) described a method for the embrittlement testing of boiler waters. Authors concluded that for steam pressures up to 250 lb. per sq. in. embrittlement may be prevented by maintaining the sodium-chloride content of the boiler water greater than 0.6 times the total alkalinity expressed as sodium carbonate along with the sodium sulfate content greater than 1.0 times the total alkalinity. For steam pressures between 500 and 1400 lb. per sq. in., these results would indicate that the presence of a soluble R_2O_3 content of greater than 0.6 times the SiO_2 content of the boiler water prevents embrittlement. For a steam pressure of 350 lb. per sq. in., the sulfate and chloride to alkalinity ratios appear to be effective in preventing embrittlement, although larger amounts may be necessary than at the lower pressures. The test unit has a feature which ties it in with actual boiler experience to a greater degree than any previous test equipment, this being the small annulus, or capillary space between the test specimen and the filler bar, and the even smaller capillary space at the top of this filler. Although the authors use boiler waters or solutions of comparable concentrations, they are able to concentrate these solutions in this capillary space in a manner distinctly analogous to the action within the seams of a boiler, a feature never before obtained simultaneously with the control of temperature and pressure.

Flotation of Barytes

Barytes stained with iron oxides becomes off color when finely ground and is unsuitable for use in the manufacture of paint and as a filler in rubber, linoleum, etc. In an effort to improve the quality of a sample of barytes from a deposit in South Australia interesting research work was carried out at the Bonython Laboratory of the Adelaide School of Mines by H. W. Gartrell and L. M. Abell (*Chemical Engineering & Mining Review*, May 10, '38, p. 298).

The sample supplied consisted of large pieces of nearly white barytes containing thin seams of specular hematite, limonite and red earthy hematite and assayed as under:

Barium sulfate	95.7%
Silica (SiO_2)	3.8%
Ferric oxide (Fe_2O_3)	0.4%

The Australian standard specification for barytes states that the material shall contain not less than 97 per cent. barium sulfate and shall be ground so that not more than 0.5 per cent. will remain on a 200 mesh I.M.M. screen. The color must be satisfactory.

Preliminary bleaching tests were carried out on material that had been ground wet in a pebble mill until only 0.5 per cent. remained on a 200 mesh I.M.M. screen. The pulp was agitated for 6 hr. at 100° C. with three parts of a solution of 30 per cent. sulfuric acid and 10 per cent. sodium chloride. The resulting product, although definitely lighter was considered unsatisfactory in color.

The barytes was floated in a Ruth type laboratory flotation machine after grinding to the sizing specified by the standard. The results are set down below. These results were given by 15 min. flotation at room temperature of 60° F. using the following reagents:

Sodium silicate	0.5 lb./ton
Pine oil	0.12 lb./ton
Oleic acid	0.25 lb./ton

Results of Flotation Tests on Iron-Stained Barytes

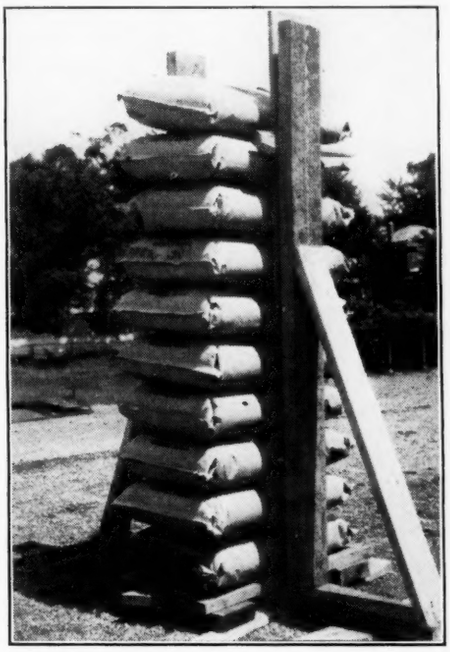
	Per cent. Weight	Per cent. Assays			Per cent. Recoveries		
		$BaSO_4$	SiO_2	Fe_2O_3	$BaSO_4$	SiO_2	Fe_2O_3
Concentrate	86.5	98.4	1.2	0.3	88.2	34.7	70.6
Tailing	13.5	84.4	14.4	0.8	11.8	65.3	29.4
	100.0	96.5	3.0	0.4	100.0	100.0	100.0

QUESTION

"Will rosin in paper bags withstand heat and pressure?"

ANSWER

"Yes - - - - - in BAGPAK Paper Bags



Exposed to the sun's rays during a period of 3 weeks—10 bags high—900 pounds pressure on the bottom bag. RESULT—There was no softening of the rosin—no flow through a one inch slit, cut in the bottom bag.

In the Standard Bagpak Rosin Bag, special sheets of Kraft paper (at no extra cost) act as insulators —ward off heat, keep the rosin hard and in condition to handle easily.

Average Temperature for Three Weeks When Bags Were Under Test

6.00 A.M. - - -	75° F.
Noon - - - -	99° F.
6.00 P.M. - - -	85° F.
Midnight - - - -	70° F.

IF YOU ARE A ROSIN PRODUCER OR CONSUMER, WRITE FOR FULL PARTICULARS TODAY

"One-man package... easy to handle"

BAGPAK INC

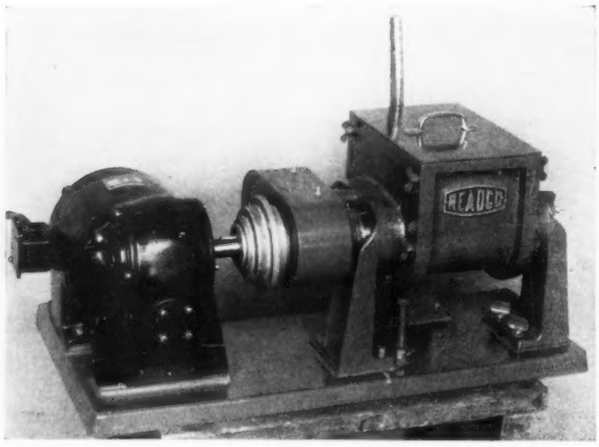
★ Trade Mark reg. U. S. Pat. Off.

220 EAST 42nd ST. NEW YORK CITY

New Equipment

Laboratory Mixer

A Readco Laboratory Mixer, designed for easy cleaning and with special features to enable close laboratory prediction of successful processing for development of equipment and products for commercial production, is being made by Read Machinery Co., York, Pa. Mixer is built with a removable outboard bearing support which allows the precision cut bowl



end to slip off the agitators and thereby considerably reduce the cleaning time. It is furnished with a reversible motor to permit forward and reverse mixing action and can be built with a steam or water jacket for heating and cooling. A vacuum or vapor tight cover can also be furnished. Units are built of non-corrosive or non-ferrous alloy metals as desired. The model illustrated has a capacity of 7/10 gal. and weighs 270 lbs.

Batch Screen

A batch screen, for sifting dry materials, and especially adaptable for short runs, test work, or low tonnage jobs that require accuracy of separation and efficient handling, is announced by Ajax Flexible Coupling Co., Westfield, N. Y. Screen is totally enclosed, dust tight, with both feed and discharge spouts arranged for boots; single deck, cloth area 12″ x 24″; overall dimensions 36″ long, 18″ wide, 15″ high; cloth and frame can be changed in 30 seconds.

Hydraulic Lift Truck

A new-type lift truck, completely hydraulic, both in lifting and lowering, has been placed on the market by Service Caster & Truck Co., Albion, Mich. Elevation of capacity loads is accomplished with as little as 100 lbs. pressure on the handle and a single stroke will elevate the load sufficient for normal operation. For the full lift, additional strokes are required, the truck automatically adjusting its ratio to the load.

Instruments for pH Control

A line of instruments for automatic pH recording and control with the Glass Electrode is a new feature of Coleman Electric Co., Maywood, Ill. New equipment is said to be of proven accuracy and practicability since it involves no new and experimental electronic circuits, and consists of three compact units; an amplifier and cell chain, housed together, a power pack, and any one of several standard recorder-controllers. Each unit is contained in a strong, fume-proof case and shielded in such a way that humid or chemical-laden atmosphere will not cause deterioration of the instruments or affect their operation.

Particle Sizer

Based upon a modification of the Werner apparatus, Colloid Equipment Co., 50 Church St., N. Y. City, has developed a sedimentation method of analyzing particle sizes below 44 microns which affords amazing accuracy of results as well as simplicity of design, speed and ease of manipulation and low first cost. Large samples are unnecessary, accurate results being obtained in about 2 hours from representative samples of less than 5 grams. New apparatus, known as the Palo-Travis Particle Sizer, operates on the principle that dispersed particles of dimensions exceeding the colloidal in a confined fluid medium tend to settle under force of gravity, and the rate of sedimentation proves the means of measuring particle size. It suffices, then, to measure accurately the rate of sedimentation. The sizer is designed for use in the hands of operatives in actual plant control. Its applications cover the entire industrial field.

Synthetic Lined Lacquer Spray

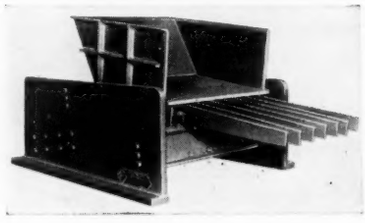
In order to supply the demand for a synthetic lined lacquer spray and solvent hose, U. S. Rubber Products, Inc., 1790 B'way, N. Y. City, has developed Off. P-243-Synthetic Lined. Lacquer and synthetic enamel sprays usually contain butyl acetate and other solvents whose action is destructive to rubber, but this new hose has proven itself superior for this purpose, it is claimed. New hose is also well adapted for use as a solvent hose, particularly in conditions where elevated temperatures up to 150° play a part. Because the tube is of synthetic stock practically no swelling develops when it is used as a solvent hose. Available in sizes ¼″ to ¾″—1 and 2 braid.

Gas Mask

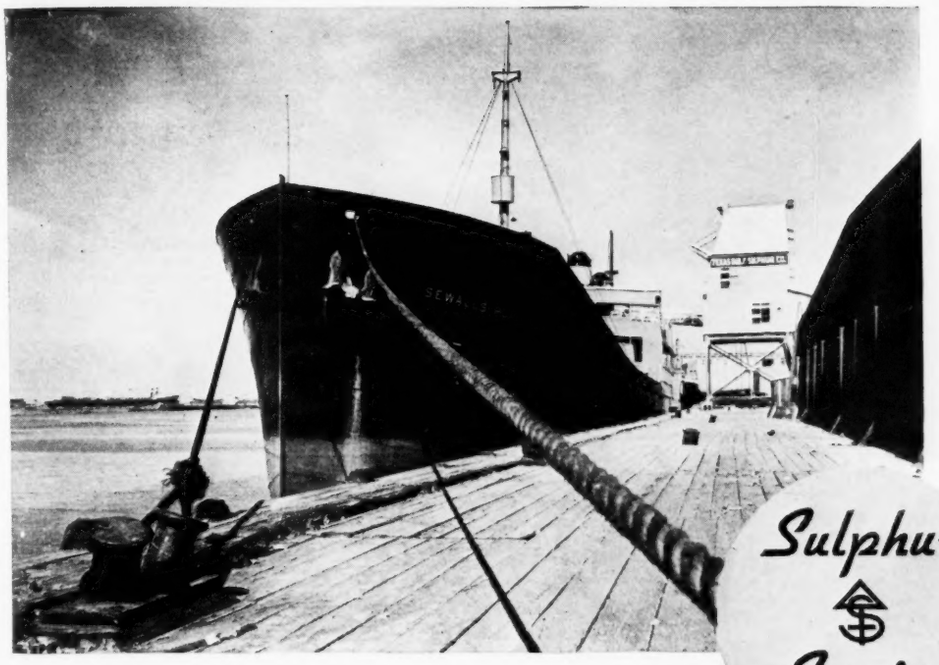
Official approval has been passed on Acme Full Vision Gas Masks Nos. 4 and 4A by the U. S. Bureau of Mines for organic vapors. Acme Protection Equipment Co., 3618 Liberty Ave., Pittsburgh, Pa., maker, states that one outstanding and exclusive feature is the Full Vision safety glass lenses which permit the wearer to see the same as when not wearing a mask. Another feature is the dead air check valves on the outlet ends of the fresh air ducts. Folder M387 on these masks is available by writing the manufacturer direct.

Vibrating Grizzly Feeders

The new Utah Electro-Magnetic Vibrating Grizzly Feeder made by Allis-Chalmers, Milwaukee, Wis., is a combination of their Utah Vibrating Feeder and their Cantilever Grizzly.



Their regular Cantilever Grizzly operates on the principle of particles of ore falling on bars which are supported only at the head end. The impact of the heavy pieces of material causes the free end of the bars to vibrate, thus increasing screening efficiency. The Utah Electro-Magnetic Feeder is a high frequency alternating current vibrating feeder which operates without any motor generator sets, sliding or rotating parts, and is a highly efficient feeding mechanism for both fine and coarse material. The combination of the Utah Vibrations and the Cantilever Grizzly principle makes a highly efficient combined feeder and scalping unit for use ahead of crushers to scalp out the fines from the crusher feed; for use in loading conveyor belts by cushioning the fall of coarse material on the fines which would drop through ahead of it, and for many miscellaneous purposes around the material handling plants.



Sulphur Service

BIG SHIPS

to Carry Big Tonnages

Second to none are Texas Gulf's marine facilities for moving its pure Sulphur in big tonnages from Galveston to all parts of the world. Ample stocks on hand at the docks eliminate delays. Modern machinery fills the holds quickly. Ships are soon underway.

These extensive shipping facilities provide a real service to users of Sulphur in the United States. Ships keep several transfer depots on both coasts well-stocked so that in emergencies buyers can get their requirements very quickly.

Texas Gulf's large enterprise is an enterprise of service.

Research is an important part of Texas Gulf Sulphur Company's activities. New arts in the use of Sulphur are being developed involving not only the melting and burning of Sulphur but also its application in new fields. The recent use of Sulphur in the centrifugal casting and lining of pipe suggests to engineers new applications for this element.

TEXAS GULF SULPHUR CO.
75 E. 45th Street New York City
Mines: Newgulf and Long Point, Texas

Booklets & Catalogs

How to get these booklets: Companies will be glad to supply copies free, provided "Chemical Industries" is mentioned and the request is made on company stationery. Your business title should also be given.

A Supplement to Molded Durez is devoted to use of this material in table radio cabinets. General Plastics, Inc., No. Tonawanda, N. Y.

A-C Magnetic Motor-starting Switch. Bulletin GEA-19H, on type CR7006-D7, distinctive features and specifications given. General Electric Co., Schenectady, N. Y.

A-C Reversing Drum Switches. Bulletin GEA-743B, on type CR3202, features, specifications, and dimensions. General Electric Co., Schenectady, N. Y.

Air Ejectors, leaflet, illustrated, different types of ejectors, where and when to use them, and outstanding design features discussed. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Air-Operated Controllers, folder, explains adaptability of Brown line to varied control requirements of industrial processing in a representative list of fifty applications; several installations illustrated. Brown Instrument Co., Phila., Pa.

Alloy Metals Review, June, 1938, constructive articles of interest to all users of alloys; special department entitled "Abstracts and References" covers patents issued in this field also recent important literature. High Speed Steel Alloys, Ltd., Ditton rd., Widnes, Lanc., Eng.

Aluminum News-Letter, July, 1938, contains several new items made from aluminum of interest to chemical manufacturers. Aluminum Co. of America, Pittsburgh, Pa.

Atmospheric Furnaces. Bulletin, performance data on SC line, compiled from installations in actual production on deoxidizing bright annealing, carburizing and nitriding, forging without scale, hardening without scale operations. Surface Combustion Corp., Toledo, O.

Brake-Motor. Bulletin GEA-2026A, information on operating characteristics, construction features, and applications. General Electric Co., Schenectady, N. Y.

Centri-Merge Wet Dust Collector. Bulletin No. 91, offers outstanding advantages in arresting dust under conditions of moisture, acid and high temperature, of much interest because of the activity now being directed towards satisfactory dust collecting equipment. Advertising Dept., W. W. Sly Mfg. Co., 4700 Train ave., Cleveland, O.

Checking Up on Check Valves, booklet, covers whole check valve field in word, picture and diagram; various applications discussed, "Do's and Don'ts" are listed, and two pages devoted to cross-section views. Crane Co., 836 So. Michigan ave., Chicago, Ill.

Controllers for Synchronous Motors. Bulletin GEA-1724A, illustrated, outlines construction and operation. General Electric Co., Schenectady, N. Y.

Direct-Current Generators and Exciters. Bulletin GEA-1607B, on type B, designed for field excitation and a wide range of industrial and general applications; specifications and ratings. General Electric Co., Schenectady, N. Y.

Duriron Heat Exchangers. Bulletin No. 1601-A, on construction and use of two different size heat exchangers for corrosive liquids, such as pickling and plating solutions; capacity curves and formula for figuring heat requirements of plating tanks given; illustrations. Duriron Co., Dayton, O.

Dust Control by Sly. Bulletin No. 90, resume of cloth type filters, their applications, as well as other general information on dust control equipment and installations; valuable to engineers and persons whose knowledge of this problem is limited. Adv. Dept., W. W. Sly Mfg. Co., 4700 Train ave., Cleveland, O.

Flexibility of LaMotte pH Control, leaflet, summarized data helpful to every user of LaMotte equipment; company products listed and priced. LaMotte Chemical Products Co., McCormick Bldg., Balto., Md.

G-E Photoelectric Relay, for automatic light control. **Bulletin GEA-2679A,** outstanding features, operation and installation instructions. General Electric Co., Schenectady, N. Y.

Gear-Motors. Bulletin GEA-1437C, complete information on integral- and fractional-horsepower gear-motors for low speed generation, construction features, etc. General Electric Co., Schenectady, N. Y.

Haveg Cold Setting Acid Resistant Cement. Bulletin N-1, outlines properties, directions for use, preliminary coating problem discussed, and chemical resistance table given. Haveg Corp., Newark, Del.

High Speed Chrome Manganese Mills, leaflet, stresses advantages obtainable through use of this type of equipment, also cites a few case histories of profitable adaptations. Patterson Foundry & Machine Co., East Liverpool, O.

His Majesty King Coal. Bulletin, written for purpose of explaining why the bituminous coal mines are not operating with better running time, interesting facts for all concerned with this industry. National Coal Association, Southern Bldg., Washington, D. C.

Laboratory Mill, complete motored unit for pulverizing, folder, covers details, operating suggestions, adaptations, and illustrations. Raymond Pulverizer Division Combustion Engineering Co., 1316 No. Branch st., Chicago, Ill.

Mallinckrodt Chemicals for medicinal, photographic, analytical and industrial uses, Price List, July, 1938. Mallinckrodt Chemical Works, St. Louis, Mo.

Manual Motor-starting Switch. Bulletin GEA-2234B, on type CR1061, designed for use with fractional-horsepower motors, dimensions and specifications. General Electric Co., Schenectady, N. Y.

Material Handling Systems. Bulletin 138, comprehensive survey of the application of conveying machinery to a wide field of industries, pictorially illustrates five essential steps in selection of handling systems: Survey, Design, Proposal, Installation and Maintenance. Gifford-Wood Co., Hudson, N. Y.

Modern Coordinated Process Control. Bulletin No. 511, outstanding features about operating results of actual installations given and illustrated; describes what system is and what it will do for plant executives in automatically controlling complete manufacturing processes. Bristol Co., Waterbury, Conn.

Moly Matrix, May, 1938, feature article "Chromium-Molybdenum Steels Answer the Question of Size." Climax Molybdenum Co., 500 Fifth ave., N. Y. City.

Monsanto Current Events, June-July, interesting story about "Pyranol, —Another Chemical Synthetic in the Electrical Industry"; also "A Chemical Canaan" on the subject of chemistry and gardens. Monsanto Chemical Co., St. Louis, Mo.

Neville Plasticizing Oils. Booklet, information on Nevinol, #2 Refined Heavy Oil, #1-D Heavy Oil, and P. H. O., includes descriptions, specifications, and uses. Neville Co., Pittsburgh, Pa.

"New Things and Stuff . . . . by Service," a new monthly news service for announcement of latest model products for material handling and newest developments in this field. For a monthly copy, address request to Service Caster & Truck Co., 645 N. Brownswood ave., Albion, Mich.

Nickel Cast Iron Data, Section 1, No. 1, 1938 revision of data sheets covering compositions and service data on industrial applications of Nickel Cast Iron; guide to selection of engineering specifications for grey cast iron, with special reference to sections of various dimensions and tensile strengths. International Nickel Co., 67 Wall st., N. Y. City.

Oxy-Acetylene Tips, July, 1938, presents to users of Linde equipment ideas which they may use to derive greater help and profit. Linde Air Products Co., 30 E. 42 st., N. Y. City.

Pedrick Seal Cut Piston Rings. Booklet, made for air compressors, pumps, gas and oil engines; outstanding features detailed, applications, and construction features illustrated. Wilkening Mfg. Co., Phila., Pa.

Portable Current Transformer. Catalog Section 43-137 discusses construction and operation of instrument designed for general portable service where maximum in accuracy and breadth of operating range are required; shows layout and design features; illustrated. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Price List. Booklet, spiral-bound, complete listing of fine chemicals and laboratory reagents made by Baker & Adamson Division of General Chemical Co., 40 Rector st., N. Y. City.

Progressive Perfumery & Cosmetics, June, 1938, extremely interesting discussion on some of the high lights in a recent survey of the operations of the American chemical industry, said to represent almost one-fifth of all the manufacturing enterprise in the U. S. Van Dyk & Co., 57 Wilkinson ave., Jersey City, N. J.

Reconditioning Flooded Electric Equipment. Bulletin GEA-2571B, general instructions for solving such problems. General Electric Co., Schenectady, N. Y.

Rod Mills. Bulletin 1821-D, well illustrated, shows various types of feeders, liners, drives and accessory equipment with helpful operating hints; clearance diagrams included. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Steam Jet Vacuum Cooling. Leaflet F.8445, on vacuum cooling adaptable for either continuous or batch cooling within a range of 35° to 65°F.; units meet wide range of applications and processes requiring combination of cooling action and evaporation, degasifying or crystallizing action. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Steam Specialties. Booklet, "The Third Essential," outlines practical method for judging how well steam specialty equipment is made to give long service without repairs; explains vital parts, and which materials are suitable to make these parts for different types of service; illustrated. International Nickel Co., 67 Wall st., N. Y. City.

Steam Turbines. Booklet, on general purpose turbines with capacities ranging from 5 to 500 h. p. at turbine speeds of 1,000 to 5,000 rpm, covers vital points to check when selecting in order to insure continuous service, economy and safety; typical installations illustrated. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Synthetic Organic Chemicals, 9th edition, 80-page book contains specifications, properties and uses of Carbide and Carbon's 105 industrial organic chemicals. The properties of 29 new chemicals which have become commercially available since the last issue of this catalog are included, as well as a complete new section on "Tergitol"' penetrants. The solubility table has been augmented to include data on 71 solvents, and a new column indicating their solvent power for rubber has been inserted A copy may be secured by writing to Carbide and Carbon Chemicals Corp., Dept. X, 30 E. 42 st., N. Y. City.

The Dutch Boy Quarterly. Vol. 16, No. 2, practical and technical discussions of paint materials, lead and related products. National Lead Co., 111 B'way, N. Y. City.

The Parkerizer, June, 1938, announces a new Parkerizing Process said to combine all the effectiveness of the older process with some vitally important new qualities that result in increased efficiency and lower cost of application. Parker Rust-Proof Co., Detroit, Mich.

The Relation of Microstructure to the Enamelability of Cast Iron. Reprint of a paper delivered by Dr. G. H. Spencer-Strong at the American Foundrymen's Ass'n Convention in Cleveland, dealing with the subject as concerned with the four major enameling defects caused by the iron, published as Enamelers' Reference No. 1, by Porcelain Enamel & Mfg. Co., Pemco & Eastern aves., Balto., Md.

Thermostatic Control Stand, leaflet, on new equipment for maintaining a constant uniform temperature of electric soldering irons when they are lying idle between soldering operations; illustrated. Electric Soldering Iron Co., Deep River, Conn.

Type B Direct-current Motors. Bulletin GEA-1542C, advantages, specifications and mechanical modifications. General Electric Co., Schenectady, N. Y.

Unmounted Roller Bearings. Book No. 1652, on complete line of radial-thrust single-row and double-row roller bearings in the naked or unmounted form; complete engineering data for figuring applications, also list prices. Link-Belt Co., 307 N. Michigan ave., Chicago, Ill.

U. S. Standard Sieves. Bulletin 222, models as specified by A. S. T. M., Amer. Ass'n State Highway Officials, and U. S. Government Highway Depts.; also lists various other types of sieves and screens for grading sand, stone and soil. **Precision Scientific Co., 1736 N. Springfield ave., Chicago.**

Utility Trucks, for cleaning in public buildings, designed to carry all necessary equipment used for this purpose. Circular No. 234, describes new trucks in detail. Lewis-Shepard Sales Corp., 245 Walnut st., Watertown, Mass.

Voltage Transformers, Type PV-130 portable, Leaflet 43-131, on line designed for use with Westinghouse portable instruments and recorders. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Welded Monel, Nickel and Inconel, booklet, outstanding advantages outlined, details of recommended practice, illustrations, and table on back gives handy reference to materials to be used in various types of work. International Nickel Co., 67 Wall st., New York City.

Wholesale Price List, July, 1938, Heyden Chemical Corp., 50 Union sq., New York City.

New Chemicals for Industry

A digest of products and processes

Dielectric Materials

MODERN synthetic resins, aside from their use for the production of general molded articles, varnishes, adhesives and laminated products for mechanical engineering purposes, are highly interesting to the electrical engineer who is constantly in search of more convenient or more effective insulants or dielectrics. This aspect of the application of plastics was discussed in detail by Dr. L. Hartshorn, N. J. L. Megson, and Mr. E. Rushton of the National Physical Laboratory and the Chemical Research Laboratory, in a paper read recently to the Institution of Electrical Engineers in London (*Chemical Trade Journal,* Apr. 1, '38, p. 261).

The primary function of a dielectric is to act as a barrier to the flow of electricity, and all the various dielectric properties used by engineers merely represent the efficacy of the material as an electrical barrier considered from various points of view. If the voltage applied to a dielectric is steadily increased, a point is reached at which the electric barrier bursts. Thick layers would obviously withstand a higher voltage than thin ones, and therefore when comparing different materials we consider the voltage per mm. or mil of thickness at breakdown.

Dielectrics always pass a leakage current, sometimes through the body of the material and sometimes over the surface. These defects are measured by the leakage current per unit voltage in the two cases, *i.e.*, by the volume or surface resistance, or, if we consider the values corresponding to a centimeter square of surface or a centimeter cube of volume, we obtain the surface and volume resistivities as quantities representing the tendency of the material to leak in these two ways. A dielectric in an alternating field dissipates energy. Just as an impermeable diaphragm yields slightly when water pressure is first applied, so the dielectric permits a displacement of electricity. The dielectric constant, or permittivity, of the material measures the amount of this displacement for a given electric force. This electric displacement vanishes when the voltage is removed, but the energy expended in making the displacement is not wholly recovered.

The total energy lost and the consequent rise of temperature will increase as the dielectric constant, the power factor, and the frequency, increase.

There is no single property of a material which can be taken as a criterion of its electrical performance under all conditions. For high-voltage work, electric strength must receive first consideration (but here again it must be noted that the breakdown may be of a surface character). On the other hand, a telephone engineer will not be much concerned with the electric strength of the materials used in his cables, but will be seriously concerned at leakage, dielectric constant and power factor. He desires a low dielectric constant and a low power factor.

The most obvious fact bearing on the problem of the connection between dielectric properties and structure is that these properties are not simply determined by the kinds of atoms which a material contains. The metals possess no insulating properties; on the other hand, mica, which is an excellent insulator, contains atoms of potassium, magnesium, aluminum, etc. There is, however, ample evidence of a connection between insulating properties and molecular structure. All the hydrocarbons are good insulators, while substitution products of high dielectric constant (alcohols, acids, esters, etc.) are greatly inferior to the corresponding hydrocarbons. Water is particularly bad.

These facts have, to some extent, been explained. Thus water, alcohol, nitrobenzene, and other liquids of high dielectric constant tend to ionize materials dissolved in them. Any electric force acting on such a material causes the two kinds of ions to drift in opposite directions along the lines of force, and it is this drift which constitutes the leakage current. Surface leakage is usually due to the motion of ions in an adsorbed film of water on the surface of a solid material. Ionic currents may also flow through solid materials. The leakage current in bodies like glass is known to be largely ionic in character, and it is quite probable that this is also true of synthetic resins, especially those prepared with strongly ionized catalysts like HCl. The phenomenon of electrical breakdown (electric strength) in resins may also be explained by these ionic currents.

There is, however, considerable evidence to show that the effect of macro-structure must also be considered. Suppose, for example, that a body consisted of a number of conducting particles embedded in a perfect insulating medium. Such a body would show no leakage current. On the other hand, on applying the electric force, ions would move within the conducting particles, the positive and negative charges collecting at either end, and when the force was removed these ions would move back under the influence of the field produced by the displacement of their charges.

The authors then described the experimental work they had carried out on the synthetic resins of the phenol-formaldehyde type, from which the following conclusions were drawn:

The power factors of the hardened phenolic resins are probably characteristic of their network chemical structure. The OH groups distributed throughout this network are known to be strongly polar, and therefore tend to set themselves in line with any electric field that may be applied to the material. When a rapidly alternating field is applied, these polar groups will therefore tend to vibrate, and it is suggested that the power loss in the material is associated with this vibration. In an ordinary atmosphere the resins take up 3 per cent. to 5 per cent. of water, which means that they acquire 1 molecule of water to each 4 or 6 benzene rings, and this quantity of water increases the power factor by 50 per cent. or more. Since the comparatively high power factor of the phenolic resins can be attributed to the presence of a polar—OH group in the unit, it would seem if a similar structure containing no polar groups could be made, it would possess electrical properties superior to those of the phenolic resins. The most obvious change to make is to replace —OH by H, thereby forming a hydrocarbon structure.

Two hydrocarbon plastics, polystyrene and polyindene, have been made in the form of clear, glass-like solids. The outstanding characteristic of these materials is their low dielectric constant (about 2.5) and very low power factor. Samples of polystyrene have given power factors as low as 0.0002, and it follows that these materials are almost ideal for work in which the minimum power-dissipation is of the first importance.

The electrical properties of the substituted materials are not so good as those of the hydrocarbons. The substitution may, however, improve the chemical and physical properties of the materials. Mixtures of various chlorinated diphenyls, for

example, may be obtained in many forms ranging from clear liquids to glassy solids. Unlike the corresponding hydrocarbons they are not inflammable, and are therefore of value in the electrical industry as impregnating media. For this purpose the increase of dielectric constant produced by the chlorination may be an advantage.

The urea-formaldehyde resin differs in structure very considerably from the foregoing resins, but appears to possess no outstanding electrical properties except that it is non-tracking. The use of a proportion of thiourea instead of urea appears to improve the electrical properties. Another heat-hardening resin, obtained by the combination of glycerol and phthalic anhydride (Glyptal), is said to be specially suitable for bonding mica (Glyptanite).

The vinyl and cellulosic resins, and since they are all thermoplastic, and used more for their mechanical properties and optical transparency than for their purely electrical properties, may be grouped together as the organic glasses. Their purely electrical properties are not outstanding. Cellulose acetate (*e.g.*, Cellomold) which combines fairly good electrical and mechanical properties with ease of injection molding, transparency, water-resisting properties, and a high dielectric constant, has, however, been successfully used for the terminations of high-voltage cables.

The ideal plastic for purposes of electrical insulation should have the electrical properties of the hydrocarbons. For the purposes of molding, it should be obtainable in a thermoplastic state, but in the finished state it should also have the mechanical properties and vitreous character corresponding to a three-dimensional cross-linked structure. No existing material satisfies all these requirements. It has been found possible to introduce a certain amount of cross-linking between the chain molecules of polystyrene by the addition of a small proportion of *p*-divinyl benzene before polymerization; but while the cross-linked structure is possible in hydrocarbons, the mechanical strength so far achieved is not equal to that of the polar materials. The following important questions arise: Are polar groups necessary in order to establish the type of cross-linking associated with great mechanical strength? If not, is it possible to find a mixture of hydrocarbon and non-polar hardening agent, which is thermoplastic at low temperatures, but which becomes hard and vitreous on the application of heat and pressure? If, on the other hand, polar forces are essential for mechanical strength, we have to find out how to control the freedom of movement of the polar groups, so as to avoid excessive energy-dissipation in the material.

Mechanical properties may also be controlled to some extent by purely physical processes. Thus the stretching of a material tends to straighten out molecules of the chain type, and therefore to modify the mechanical properties of the material in certain directions. A process based on this principle has recently been patented for the production of flexible foils and threads from polystyrene, which is normally brittle. The process is one of extrusion through an orifice, and the flexibility is controlled by adjustment of the tension of withdrawal and pressure of extrusion. Such threads may have important applications in the manufacture of cables for use at very high frequencies.

Mica still stands alone as a dielectric. It possesses most excellent electrical and thermal properties, but its mechanical properties severely limit its application, and it has no plastic properties. Fused quartz has the electrical properties of mica, and some rudimentary plastic properties, but it lacks the flexibility and toughness of mica. From fused quartz we may pass, by way of a graduated series of inorganic glasses, all rather brittle, to the very tough "organic glasses," but here we have lost the electrical properties. They appear again in polystyrene, but there the thermal properties are missing and the mechanical properties are impaired. There are vast unexplored regions between mica, fused quartz, polystyrene, and our toughest plastics, but we know that the insulating material we seek is within these known limits, and that it is a plastic.

Sulfur as Turf Dressing

Use of sulfur as a dressing for wet turf was the subject of a paper delivered by B. M. Boyns, to the annual Greenkeepers' Conference of the Board of Greenkeeping Research, recently held at the St. Ives Research Station, Bingley, Yorkshire, and reported in *Chemical Trade Journal,* June 3, '38, p. 467.

New Laminated Material

A new Bakelite laminated material is being made by Synthane Corp. (*Modern Plastics,* July, '38, p. 50). In place of the usual paper or fabric base, this material uses a woven glass fabric. Glass, tests show, gives a low moisture absorption which has not been duplicated previously in laminated phenolic resinoid materials. Other advantages reported are a minimum change in electrical characteristics, and greater resistance to the action of corrosive liquids.

Methallyl Chloride for Destroying Insects

Insects that take a huge toll of stored products may be effectively exterminated through use of methallyl chloride, a petroleum derivative. Method, discovered by C. J. Briojer and reported in British *Nature,* is said to be also successful in extermination of other insects, and a consideration of major importance in its use is that mixtures of its vapor with air are not explosive over a wide range of concentration.

Lacquer Finishing Method

A method for hardening or hastening drying of leather lacquers, reported in *National Paint Bulletin,* June, '38, p. 9, is to pass the material slowly under ultra-violet light. In this method, the air should also be kept substantially free of ozone.

Plastics Developments Abroad

Plastics of contrasting colors are now being produced in a single molding operation (*British Plastics,* June, '38, p. 38). New process enables combinations of phenolic and urea moldings to be produced with a predetermined surface design.

In the same issue is a report on a new form of cellulose acetate plastics, called "Rhodoid," possessing fluorescent and luminescent qualities. Manufacturer is May & Baker, Ltd., London, England. It is said to have many unusual applications.

Metal Decorations for Ceramics

A scientific process for producing liquid bright gold and other precious metal decorations for ceramics has been developed by du Pont. By use of established standardized materials and rigid chemical control, a product has been made which is said to have a dependable high degree of uniformity and to be fitted for more speedy operations than previous formulas. The outstanding qualities of this new product are said to be effective and economical application, wide firing range and improved color.

Company has also perfected a new line of "lustre" colors made from precious metals. These are applied to crystal ware and produce a transparent, scintillating effect of deeper tones. The wide variety of colors ranges from pastels to deep tones like amethyst violet.

Lecithin from Beet Molasses

A recent Russian patent covers treatment of a molasses solution with copper sulfate, the precipitate being extracted with methyl alcohol for separation of lecithin, according to *Chemical Trade Journal,* July 8, '38, p. 32. The residue is heated with sodium sulfide, a dilute solution of sulfuric acid added, and the cuprous sulfide filtered off. After making the solution alkaline to litmus with caustic soda, guanine is filtered off. The filtrate is evaporated to dryness, the residue treated with sulfuric acid, the solution filtered, and the filtrate neutralized with ammonia. Any precipitated guanine is filtered off, the filtrate treated with lime, again filtered, and then evaporated to dryness to obtain adenine and hypoxanthine as a residue.

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SOLVENT NEWS

Reg. U. S. Pat. Off.

August ★ A Monthly Series of Articles for Chemists and Executives of the Solvent-Consuming Industries ★ 1938

Claims New Thermal Process Coats Paper Faster and Cheaper

Heated Rolls Apply Mixture of Synthetic Resins, Rubber & Wax

Arrangements for licensing the manufacture of coated paper by the new "Dry Coating" process have been completed, Bert C. Miller, the inventor, disclosed to SOLVENT NEWS recently.

"Dry Coating" is a method of applying glossy or dull, smooth finishes to paper by means of a molten mixture of synthetic resins, waxes, crepe rubber and other coating materials. Neither solvents nor vehicle carrier are utilized, according to Mr. Miller. The plastic cools and sets on contact with the paper. Papers processed by this method have the appearance and feel of other coated papers but are several times more moisture resistant, Mr. Miller said.

Cuts Cost 50-75%

Chief interest, however, centers about Mr. Miller's statement that paper can be Dry Coated at savings of 50-75% under the cost of applying other special coatings to papers of equal weight. Comparing the process with various methods. Mr. Miller told SOLVENT NEWS that the cost is comparable to those of commonly used clay or casein coatings and varnish, but is slightly in excess of wax coatings.

Reference to the basic patents covering the process reveals that Mr. Miller dissolves shredded crepe rubber in a wax heated to its melting temperature, adds to this mixture a synthetic resin and other ingredients, depending upon whether transparent, opaque, glossy or dull finishes are desired. The following is a typical formula listed:

	Percent
Rubber-wax	5
Compatible common resin	60
Stearic acid wax	5
Metallic soap	20
Non-oxidizing oil plasticizer	10

Relatively few resins may be used, Mr. Miller indicates, but modified alkyds have been employed successfully. Others found suitable

(*Continued on next page*)

Pigment Performance Is Predicted By New Table

HALEDON, N. J.—A new classification system for pigments utilizing 11 basic groupings has been announced here by V. C. Vesce of the Harmon Color Works.

In place of previous systems based upon hue and color, Mr. Vesce has substituted groupings into which any given pigment may conveniently be placed by means of a few simple chemical tests.

Apart from simplifying the analytical study of pigments, the new system has been found especially adaptable in predicting a use for a pigment where another in the same class has been utilized. according to Mr. Vesce.

Believing that many SOLVENT NEWS readers would like to have copies of Mr. Vesce's article, it will be published in the 4-page SOLVENT NEWS folders mailed without charge to subscribers. To receive your copies, simply write to U.S.I. and ask that your name be added to the SOLVENT NEWS mailing list.

A.O.A.C. Adopt S.D. 30 For Fatty Acid Determination

MENASHA, Wisconsin—Specially denatured alcohol formula No. 30 has been adopted by the Association of Official Agricultural Chemists for the determination of free fatty acid content of crude and refined oils, according to the Association's *Journal*.

In the method described, the fatty acids are titrated with caustic soda dissolved in S.D. 30 (Authorized Composition: to 100 gallons of ethyl alcohol add 10 gallons of pure methyl-alcohol).

Non-Fiber Raising Stain Made With Ethyl Lactate

CLEVELAND, Ohio—By combining water with selected organic solvents so that all the water evaporates before the organic solvent, wood stains which are non-fiber-raising and non-bleeding may be produced, it is claimed in a patent issued to an inventor here.

"The organic solvents seem to exert a protective action on the wood fiber, preventing the water from soaking into the cells," the inventor asserts. At the same time, he adds, the combination makes it possible to use water-soluble dyes which have relatively good lightfastness and no tendency to bleed into lacquer finishing coats.

Citing an example of his invention, the patentee lists the following formulation which "will not raise the fiber on any wood at any working temperature."

	Parts by Wgt.
Water-soluble dye	0.25
Water	2
Ethyl lactate	5
Methanol denatured alcohol	3

The dye is first dissolved in the water, ethyl lactate added, and then alcohol. A formulation of this type will not leave a greasy residue, it is stated.

[Ethyl Lactate is a product of U.S.I.]

U.S.I. Phenol Resins Eliminate Need For Large Inventories

N-100, N-300 and QD-1 Types May be Adapted to Most Needs

Greater interest in and acceptance of the idea that no large number of phenolic resins is needed to meet the requirements of modern varnish formulation is indicated by the increasing tendency for manufacturers to standardize on three phenolics manufactured by the Synthetic Resin Division of the U.S. Industrial Alcohol Co.

Employed in proper combination and blend, these three resins—Rauzene N-100, Rauzene N-300 and Rauzene QD-1—make possible a substantial reduction in resin inventories without sacrificing, at the same time, any of the well recognized advantages of the phenolic class.

This is the second of a series of articles which outline some of the applications of U.S.I. synthetic resins. Later articles will cover alkyds and copal esters.

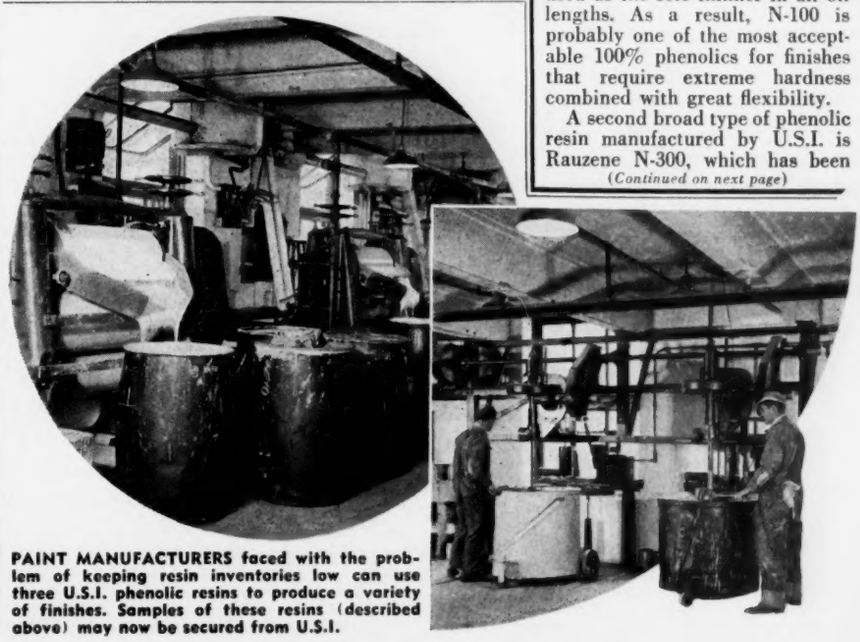
Varnishes formulated with Rauzene N-100, a 100% phenolic of the heat-reactive, heat-hardening type, are outstanding in their resistance to strong alkali, acid, and boiling water. Just a few of the many finishes for which N-100 is preferred are exterior enamels, spar and marine finishes, and even whites. In the latter use, N-100 probably outranks comparable grades of 100% phenolics.

Yet, with all its versatility, N-100 is one of the most easily handled resins, since its reaction in the varnish kettle with chinawood and other oils is completely controllable. A special point in its favor lies in the fact that cooking at temperatures of 460° F. gives complete gasproofness with wood oil.

In addition to this, mineral spirits can be used as the sole thinner in all oil lengths. As a result, N-100 is probably one of the most acceptable 100% phenolics for finishes that require extreme hardness combined with great flexibility.

A second broad type of phenolic resin manufactured by U.S.I. is Rauzene N-300, which has been

(*Continued on next page*)



PAINT MANUFACTURERS faced with the problem of keeping resin inventories low can use three U.S.I. phenolic resins to produce a variety of finishes. Samples of these resins (described above) may now be secured from U.S.I.

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August ★ **SOLVENT NEWS** ★ 1938

Reduce Resin Inventory With U.S.I. Phenolics

(*Continued from preceding page*)

modified to give it special properties such as fast drying. The phenolic base from which N-300 has been derived is of the non-yellowing type so that very fine whites can be produced from vehicles containing this resin.

A typical application where the toughness of N-300 may be utilized is in floor varnishes. Another well-recognized use is in "four-hour" enamels.

In the lower priced class, but with many special advantages of its own, is Rauzene QD-1, also a modified phenolic. While QD-1 is not designed for white formulations, it has numerous other applications in clear varnishes and colored enamels where it imparts extreme hardness and very fast, tough drying.

Special Grades Available

Like N-100 and N-300, QD-1 is also easily handled, and requires merely routine care to obtain best results. Any type of dryer may be used, either solid types, cooked in, or liquid types added after thinning.

In addition to the three fundamental phenolic types described above, U.S.I. manufactures several special grades which are supplied to fulfill certain specific requirements where definite characteristics are needed. A reference chart describing the complete line of U.S.I. phenolics will be supplied upon request.

Report World Chemical Industry Up During '37

WASHINGTON, D. C. — Considerable improvement in the financial condition of the chemical industry is reported in "World Chemical Developments In 1937" just published by the Dept. of Commerce, Bureau of Foreign and Domestic Commerce. A copy of the highly informative 221-page booklet which is Trade Promotion Series No. 177 may be obtained from the Superintendent of Documents for 25 cents.

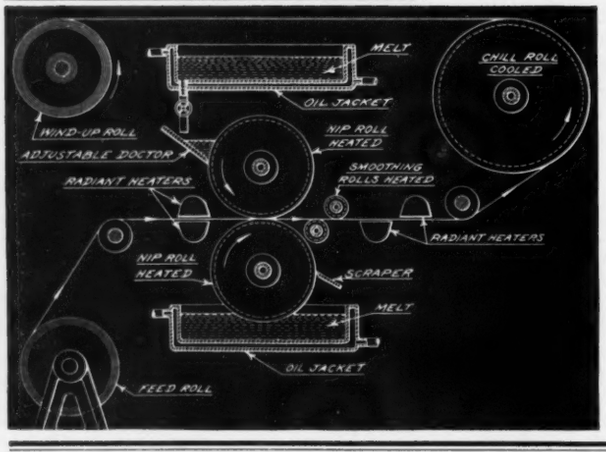
New Heat Process Coats Paper Faster and Cheaper

(*Continued from preceding page*)

include varieties of modified phenolics. The plasticizer may be diamyl- or dibutyl-phthalate.

"Dry Coating" is essentially a surface coating, Mr. Miller emphasized. Poorly formed papers or very porous bases may be coated with very little penetration and no curling. Heavy films of six or eight pounds per 1,000 square feet, can be produced in one application, he said. In addition, Mr. Miller pointed out, the coating can be used for laminating.

At present the "Dry Coating" method cannot be applied to paper in sheet form because of manufacturing difficulty arising from immediate setting of the coating and the necessary control of tension, Mr. Miller explained. It can, however, be applied either before or after printing. Inks used for printing over the coating must dry by oxidation. Fifty different compositions have been developed to meet varying needs.



"DRY COATING"

One or both sides of the paper may be coated with the equipment shown at left. The melt is kept at approximately 275-300° F. Paper passing from the feed roll through heated nip rolls receives a coating of predetermined thickness and moves on to a chill roll cooled preferably to sub-zero temperatures. Speeds ranging from 50 to 500 feet per minute are practical, according to Mr. Miller, inventor of the process.

(From B. C. Miller's patent.)

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

Development of a new germicide and fungicide with a phenol coefficient of 57 against *E. typhi* was announced recently. It is intended for use in the production of aqueous antiseptic solutions and the preservation of adhesives, pastes, hides, dextrine, albumen, etc. The product is said to be water-soluble, non-irritating to the skin and relatively non-toxic, especially in the low concentrations of practical use. **(No. 121)**

U S I

Amorphous waxes said to be good substitutes for beeswax and also for ozokenite in many applications have been introduced. The melting points range around 165°F. but films of the waxes are unaffected by submersion in water at 175°F., according to the manufacturer. The waxes are tasteless and odorless as well as plastic at freezing temperature, and remain amorphous after continued or repeated heating, he adds. **(No. 122)**

U S I

A new type of cedar-leaf oil for paints is described as a heavy viscous product like cedarwood oil, but which has all of the virtues of the original leaf oil, without its extreme volatility. This oil is said to possess strong insecticidal properties as well as an extremely fragrant and pleasing odor. **(No. 123)**

U S I

Postitive detection of leaks in refrigeration systems using chlorinated hydrocarbon refrigerants is claimed for a new halide leak detector. The detector uses an alcohol-type fuel said to burn with a distinctive color in presence of such refrigerants as Artic, Carrene, Freon, etc. **(No. 124)**

U S I

A new emulsifying-type disinfectant is said to have an unusually pleasing lilac odor, a phenol coefficient of 5 and is non-toxic, -corrosive, -irritating, -caustic or -poisonous. It is also stated that the material does not deteriorate with age and possesses an odor so pleasant that it can be diluted with water and used as a theatre spray deodorant. **(No. 125)**

U S I

Ninety-nine per cent of the paint pigment in fumes from paint spray booths can be removed by a new efficient and economical device which employs a set of precipitator plates and a water curtain, according to a recent announcement. **(No. 126)**

U S I

Perfect wood grains, marble effects, and other designs can be produced on either wood or metal by means of a new graining process, according to the developer. The process is expected to be of particular interest to manufacturers of home furnishings. **(No. 127)**

U S I

Lacquer spray and solvent hose lined with high-grade synthetic rubber material is said to resist the action of oils and commonly used paint solvents, even at temperatures up to 150°, without swelling. The hose is available in sizes from ¼- to ¾-in., an announcement continues. **(No. 128)**

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Resembles Tung Oil

Essong oil, derived from the seeds of *Ricinodendron Africanum*, is reported in *National Paint Bulletin*, June, '38, p. 10, as a new product resembling tung oil. The oil content of the whole seed is 15 to 19% and 40 to 50% of the kernel. On extraction of the whole seed, a golden yellow oil is obtained with constants which make it similar to tung oil. Detailed analysis of new oil will be found in the original article.

Copper Recovery from Cuprammonium

Copper is recovered as hydroxide from the waste liquors of the cuprammonium artificial silk industry by mixing the spent cupriferous alkaline precipitating bath and the cupriferous acid from the process of removing copper from the fibres in such proportions that the *p*H of the mixture is between 6 and 8, preferably 6.5 to 7.5, and running the mixture, preferably immediately into a filter charged with sand or similar material, from the surface of which the flocculated copper hydroxide is removed from time to time, as by back-washing or hand skimming. In an example the spent precipitating bath contains 0.145 gramme Cu and 0.672 gramme ammonia per litre, and the spent acid 7.90 gramme Cu and 66.7 gramme H_2SO_4 per litre, and the two are mixed in the proportion of 100:2.20 by allowing them to flow together. (E. P. 481,741, *Chemical Trade Journal*, July 15, 38, p. 62.)

Laboratory Paint

Fillox, a laboratory paint, is announced by Scientific Glass Apparatus, 49 Ackerman St., Bloomfield, N. J. Fillox enamels are based on non-oxidizing, non-saponifying, urea resins that contain no nitro-cellulose or oil-soluble compounds. These enamels can be brushed or sprayed on, and dry quickly, forming a smooth, glossy finish. According to company, a coat of this corrosive-resistant paint will protect laboratory walls and tables from the effects of destructive fumes and chemicals.

New Refractory

A new refractory recently placed on the market by Laclede Christy Clay Products Co., St. Louis, Mo., combines the high refractoriness of the diaspore clay with the extreme spalling resistance of the super-duty fire-clay brick. Known as Laclede Peerlac, refractory is power-pressed, non-spalling, non-shrinking and slag-resisting. Its use is indicated where very high temperatures are combined with sudden temperature fluctuations, heavy loads, or the action of destructive slags. Special shapes can be made in almost any design.

Synthetic Oil

A series of synthetic fatty acids and their glycerides that appear to have valuable film-forming properties has been developed in the research laboratories of Armour Meat Packing Co., Chicago. These fatty acids and the oils prepared from them are known as "Neo Fats," meaning new fats. They consist of relatively pure, highly unsaturated acids similar to clupanadonic and linolenic acids. It is possible to esterify these fatty acids with glycerine and other polyhydric alcohols to produce clear, viscous drying oils that possess remarkable flexibility and toughness when dry. The cost of these products is almost as low as the raw oils from which they are prepared.

Titanium Alcoholates

Titanium alcoholates are made by reacting titanium tetrahalides with an alcohol and ammonia or an organic base. In the case of higher alcohols it is preferred to make a lower alcoholate first, and react this with the higher alcohol. When using organic bases, it is preferred to add an organic solvent such as benzene, ether or carbon tetrachloride. (E. P. 479,470, *Chemical Trade Journal*, July 1, '38, p. 18.)

Semi-softening Agent

Recent laboratory tests have indicated that Utanol can be adopted for a variety of rubber stocks, ranging from tire tread to belt cover stocks. (*Rubber Age*, July, '38, p. 227). Utanol is a natural sulfurated bitumen, occurring in a unique deposit beneath the Great Salt Lake in Utah, produced by the Rozel Asphalt Co., 311 Central Building, Ogden, Utah. Although possessing definite softening characteristics, it is best described as a semi-softening agent. It is velvet black in color, has an asphaltic odor, softens at 135° to 138°F., and has a specific gravity of 1.019. It is totally soluble in carbon tetrachloride, benzol, and petroleum ether, has a fixed carbon content of 4.55 per cent. and contains more than 10 per cent. of organically combined sulfur.

Production Pure Zinc Sulfide

Pure zinc sulfide is prepared by dissolving commercially pure zinc sulfate in twice distilled water, electrolyzing with platinum electrodes for two weeks at two volts, boiling several times with adsorption carbon, filtering, adding ammonia dissolved in twice distilled water, filtering, and introducing hydrogen sulfide, prepared from iron sulfide and hydrochloric acid and washed in dilute hydrochloric acid water, potassium hydrosulfide, and twice distilled water. A small quantity of hydrogen sulfide is first introduced and the precipitate is filtered off, dried, heated with a flux to 400° C., and tested by means of cathode rays. The partial precipitation is continued until the blue luminescence does not vary with further samples. The whole quantity of zinc salt is then precipitated as zinc sulfide, and after filtering and drying heated with pure sulfur in a hydrogen atmosphere to 400° C. Cadmium sulfide may be similarly prepared, the control test being made on precipitated samples mixed with appropriate quantities of the pure zinc sulfide. (E. P. 473,715, *Chemical Trade Journal*, July 1, '38, p. 18.)

Month's New Dyes

General Dyestuff announces: Celliton Discharge Scarlet RNL, which produces on acetate fabrics bright scarlet shades which can easily be discharged to a pure white by Decroline Soluble Conc. Fast Dark Blue Salt R is said to produce on Naphthol AS ground midnight navy blues of very good light and wash fastness. Hydron Printing Blue 3R Suprafix PDR is a highly dispersed vat powder of particular interest for producing smooth prints on pigmented rayon, of a reddish navy. Anthralan Brown 4G is a new, straight, acid brown, brought out by I.G., which dyes very level and produces brown shades of excellent fastness to light. It is especially recommended for dyeing carpet yarn.

New du Pont developments include: Leucosol Black RA Double Paste, vat dye, yielding a bluish black printing color, suitable for direct or color discharge printing, and developed for cases where other colors have given trouble by marking off on white grounds or viscose process rayon fabrics. Fast Blue 4 GLN, new "Pontamine" dye, is said to be equal in strength, fastness to light, and general application characteristics to "Pontamine" Fast Blue 4 GL. It produces, however, a more desirable shade which is noticeably greener and brighter. It is designed for use on loose cotton, yarns and pieces, especially for fabrics where fastness to light is demanded. Du Pont Auramine SP Concentrated, a basic color for spirit printing, is useful where straight basic colors are used in preference to the "Rotalin" colors, and where fastness to water bleeding is not a factor. New color is equal in strength and shade to Du Pont Auramine Concentrated, but is much more soluble in alcohol. "Rotalin" Red B Extra Concentrated was developed in response to a demand for a bluer shade of red for spirit printing. It is similar in color to the other "Rotalin" colors and may be handled in the same manner in preparation of spirit printing inks.

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A digest of new uses and new compounds

Compounds for Concrete Treatment

By Charles F. Mason, Ph.D.

THE rapid introduction of concrete into many diversified uses has stimulated research and scientific development relative to its mechanical properties, especially reinforced concrete; but, as is usually the case, has hindered any tests of which gases, liquids or solids would promote deterioration. It is only after such structures are in place and badly deteriorated that technical men are called upon to save them.

Reliable information upon this subject is not plentiful for industries which are as old and basic as steel, petroleum and coal. Even today our construction engineers fail to take concrete deteriorating agents into consideration, as evidenced by several examples which have come to the writer's attention in recent years. It is known, by experience, that mineral and organic acids in any concentration in solution, or the vapor phase, water soluble salts, especially the sulfates, carbohydrates, in solution, promote deterioration of concrete by dissolving the calcium components.

A recently constructed rayon plant built a concrete basement surmounted by a high brick stack for the discharge of obnoxious gases. A spin bath solution consisting of water, sulfuric acid, sodium sulfate, glucose and dissolved organic sulfur compounds, was carried along mechanically by the exhaust fan and deposited in the basement with no provision for draining or flushing. This was ideal for disintegration of concrete walls, and after two months' operation, two weeks were lost in applying an asphalt coating to save what remained.

Another case was a soft drink bottling plant, located high up in a city loft building where the drip from bottling machines fell directly on the concrete floor. These carbonated, slightly acid sugar solutions seeped through to the point where the floor was weakened and could only be repaired with a water-proofed overlay.

Many cases could be described; for instance, industrial wastes from the Pittsburgh steel district combined with mine water from the coal district, promoting the deterioration of piers in Philadelphia, Baltimore, and Washington. These, however, should be sufficient to convince anyone that the easiest way is by admixtures and impregnators when the concrete is laid, rather than by film coatings after deterioration has set in.

One successful case of concrete construction for storage tanks in a chemical industry is the storage of 30 per cent. nitric acid solutions in concrete tanks lined with asphalt and of 200 tons capacity. Asphalt emulsions which can be mixed with water at the point of use and applied with a trowel, like cement, have been introduced recently and are meeting many needs; *e.g.*, water-proofing and deterioration difficulties. These emulsions eliminate the trouble of melting asphalt just before application and breathing obnoxious fumes, once common on our city streets.

Aside from these industrial projects, concrete surfaces often require coatings of a more decorative than protective effect, after they have already been laid upon the earth and are exposed to the elements from above and dampness from below. It is for these purposes that a few remedies are given.

Concrete surfaces exposed to severe mechanical action like steel wheeled trucks, which continually abrade in the same path and form ruts or surfaces, simultaneously exposed to such mechanical waste and chemical solutions, are not considered here. Solutions of sodium silicate are sold widely for spreading upon cement or concrete floors to prevent an undue amount of dust and to prevent a rough surface which results from mechanical abrasion followed by daily sweeping. The water of such solutions eventually evaporates and a glassy solid is deposited in the interstices. However, its continued use increases the alkalinity of the surface layer already alkaline from hydrated lime; and makes the possibility of subsequent painting more remote.

Zinc sulfate crystals are sold in large quantities through paint stores, with instructions to dissolve them in water (2 to 8 oz. per gal.) and apply solution with a brush, allowing it to dry before subsequently applying a paint film. This neutralizes free lime at the surface and deposits two neutral insoluble solids. It is sometimes satisfactory if the original concrete has been well mixed mechanically, so that the lime is uniformly distributed. When this is not the case the paint film suffers rapid deterioration at high lime concentrations, known by painters as hot spots. In tropical countries exposed to severe wind storms, the average house is of one story and is built of concrete. Those who wish to decorate inside by painting only, rather than plastering and papering, find it almost impossible to avoid peeling in spots.

Other White Salts

Other white salts instead of zinc sulfate are aluminum sulfate, calcium acid phosphate, magnesium sulfate, and ammonium sulfate; a few colored salts are copper sulfate, chromium sulfate and iron sulfate. It is a strange fact that prominent paint and varnish manufacturers market what they call concrete enamel, but recommend treatment as described above.

Some of the following formulae require no treatment.

1.	Tetra-chlor-naphthalene	10	
	Cumar resin	10	This resists acids.
	Oil, castor or linseed	20	
	Varnoline	60	
2.	Paraffine	70	
	Beeswax	10	Painted on hot for water-
	Carnauba wax	10	proofing tanks.
	Dry colors	10	
3.	Cumar or Bakelite	10	
	Linseed, Acids	20	
	Fillers, Neutral	30	
	Varnoline	40	
4.	Gasoline	80	
	Cumar resin	14	For cement molds.
	Naphthalene	6	
5.	Cumar resin	34	Applied hot for water-
	Beeswax	33	proofing.
	Paraffine	33	
6.	Gilsonite	30	For concrete wine tanks.
	Varnoline	70	
7.	Gilsonite	20	
	Ceresine	20	
	Varnoline	60	
8.	Magnesium oxide	10	
	Calcium sulfate	10	
	Dry colors	10	
	Asbestos fiber	12	
	Sawdusts	8	
	Magnesium chloride soln. 30%	50	

9. Cumar resin	15
Carnauba wax	5
Rubber	5
Fiber asbestos	15
Varnoline	60
10. Portland cement	30
Sodium silicate 40%	50
Varnoline	5
Fillers, earths	15

Admixtures like talc, or one of the earths have met with success in reinforcing and water-proofing concrete. These are mixed into the cement before it is packaged, and the combinations are sold under special trade names. They find use in milk stations, bakeries, kitchens, etc., where abrasion combined with destructive action of sugar solutions, fats, and vinegars, promotes the deterioration of the floors. The age of these impregnators and coatings naturally varies with the conditions. One example is that of a set of concrete posts covered with paraffin in one test and asphalt in another and immersed in 30 per cent. sodium sulfate solution. Without mechanical abrasion the coatings were resistant for only three years, after which deterioration proceeded rapidly.

Cleaning Compound for Inside of Motors

A novel compound for washing the inside of a motor block or engine having tarry carbon deposits has been introduced by Curran Corp., Malden, Mass., under the name of Gunk Compound—M. F. (Motor Fizik). It is described as a vapor-phase solvent oil to be introduced into the hot combustion chambers of the automobile engine while motor is running and should be used in quantities substantially sufficient to "drown out" the engine.

Non-petroleum Lubricant

"Orel," a non-petroleum lubricant for use as an anti-squeak for all rubber parts and metal-to-metal contacts on the chassis of automobiles, buses and trucks is a new du Pont development. Lubricant is said to be harmless to rubber, yet one that will quickly penetrate and efficiently lubricate rubber bearings and all metal-to-metal chassis bearings.

Protective Lacquer

A lacquer, based on methacrylate, which protects metals from rust and corrosion caused by salt spray and moisture, and is said to be particularly adaptable for boat fixtures, is announced by du Pont. It is applied with a brush, and dries in 15 minutes, forming an invisible film over the surface, affording protection to brass, bronze, silver, copper, chromium and similar metals.

Lacquer is marketed in a package known as the Chrome Refinishing Kit, which contains a tube of paste cleaner, a can of lacquer and a brush. The cleaner is essentially for cleaning rusted chrome parts, preparatory to applying the lacquer. Other metals should be polished with a mild silver or metal polish before the lacquer is applied.

Soluble Cutting Oils

A series of soluble cutting oils called the "60" Series and including Hocut 60, Metcut 60 and Permazol 60 is announced by E. F. Houghton Co., 240 W. Somerset St., Phila. Chief features claimed are: (1) permanence in solution—will not break down even under boiling conditions, (2) rust preventatives have been added, (3) self-emulsifying, mix immediately in cold solutions and may be used at once, (4) good lubricants and coolants—lengthen tool life, (5) freedom from gumming, (6) rapid wetting out agents have been added—speeds up production, (7) antiseptically treated, (8) economical, mix to extremely dilute solutions, (9) contain no volatile materials to evaporate off.

New Use for Butyl Carbinol

A satisfactory formula for a quick-drying stamp pad ink is given by Waters (Bureau of Standards *Journal of Research*, '38, 20, 543-547). Author found that butyl carbinol, which is the mono-butyl ether of diethylene glycol, is as efficient as alcohol in promoting rapid absorption by paper of the ink to which it is added, and since its B.P. is 222° C., it is almost involatile. Best composition was found to be 40 per cent. glycerol, 40 per cent. water, 20 per cent. butyl carbinol, by volume. A pad so impregnated can be left open for weeks without losing its quick-drying properties.

Black and White Baking Enamels

A series of four production black baking enamels, "A"—"B"—"C" and "D," is being offered for low-cost product finishing, by Sherwin-Williams Co., Cleveland, and is said to set a new standard for value, performance and service.

Same company also offers a new line of white baking finishes, known as Kem Appliance White Enamels, and claims many features of interest to manufacturers of appliance, hospital furniture, and general utility items.

Rubber Dressing

A rubber dressing, in paste form, for cleaning and restoring the original color to tires, running boards, rubber mats and other rubber products, is announced by Simoniz Co., 2100 Indiana Ave., Chicago. Paste can be easily applied with a damp cloth, and after being wiped off with a dry cloth, the original sheen of the rubber is restored. There is nothing left over the surface to check or deteriorate the rubber itself, according to the manufacturer.

Luminescent Paint

Lufrolac, a luminescent paint, particularly interesting for purposes of passive defence, is a new French development (*Paint Manufacturer*, May, '38). Product is result of experiments by Monsieur Nussbaum, who has developed a substance which permits the paint to remain visible for a considerable length of time. This consists of a sulfate of an alkaline earth and a salt or salts of heavy metals plus a fusible substance such as lithium, sodium, or potassium. To this a quantity of magnesium salts is added. The powder obtained is mixed with a special supporting varnish designed to be as transparent as possible. Special solvents are also used. Details both of the composition and preparation are secret.

One-fire Finish

A one-fire finish, using Pemco V-134 Frit, developed principally to give a low cost finish of a more durable character for inexpensive merchandise, is announced by Porcelain Enamel & Mfg. Co., 5106 Eastern Ave., Balto. Finish is said to have a good lustre; is attractive in appearance; can be sprayed over the bisque ground coat, and is obtainable in one-fire.

Flame-proofing Compound

Abopon Special, a new flame-proofing compound, is now available from Glyco Products Co., 148 Lafayette St., N. Y. City. Product is in form of a dry material, is easily handled, and practically eliminates "after-glow" on such hazardous materials as kapok, plush, velvet, cotton-batting, etc. Although material is not water-proof, it dissolves but slowly when exposed to rain. Where permanent water-proofness is necessary, users first apply it to the material to be flame-proofed and allow it to dry. Then it is coated with a water-proofing such as lacquer or varnish which adheres firmly to the flame-proof coating. Thus, the flame-proofing is protected against rain, etc. When a flame is applied to the treated material, the thin lacquer or varnish burns off quickly producing a flash flame that vanishes quickly while the material underneath does not catch fire.

Mildewproofing Textile Fibers

By J. Hendrik Hutten

DAMAGE to cotton fibers, either in raw or finished, by mold or fungus attack, commonly called mildew, has been estimated as exceeding one hundred million dollars per year in the United States.

Mildew spores propagate on the fiber by drawing nourishment from the cellulose of the cotton, from starches, sugars or proteins inherently present in the fiber or fixed thereon by finishing operations. In addition to these nutrients they require moisture and heat as favorable conditions for growth.

If the moisture content of cottons is below 8 or 9% water, which is the normal "water of condition," little or no damage from mildew results, but due to excessive moisture in the air and exposure to rain and water, especially of out-door fabrics like sails, tarpaulins, awnings, bags, fire hose, etc., it is not possible to control moisture so as to prevent the growth of mildew organisms.

It has long been a common practice to disinfect starch mixtures used for finishing cloth with zinc chloride. This substance, to be effective as a mildew preventive, must be present in concentration of at least 0.8 per cent. calculated on the weight of the cloth. Due to the fact that zinc chloride is highly hygroscopic and causes tendering of the cloth, it is either inadvisable or impossible, in many cases, to apply the necessary concentration without damaging effects. Moreover, zinc chloride will leach out of the fabric by contact with water, unless precipitated as an insoluble zinc salt by a separate finishing operation. Thus, the only apparent advantage in using it for mildewproofing is a reasonable cost.

Other common disinfectants, such as sodium silicofluoride, phenol, cresol, salicylic acid, trichlorphenol, etc., have not proved satisfactory alternatives. Their shortcomings are due to different reasons, such as offensive odor, staining qualities, difficulty of application, toxicity to the user, and so on. A good example of the latter kind is mercuric chloride which, while highly germicidal and fungicidal, is extremely toxic to humans, which in conjunction with its solubility in water, precludes its use as a practical fungicide.

An ideal mildewproofing compound for textiles should have the following qualities, which are only partly met by most antiseptics now used or recommended for the purpose:

(1) Highest possible antiseptic efficiency.

(2) It must not volatilize during the boiling of the size or finishing mixture, or during the drying of the sized yarn or cloth.

(3) Water-insolubility, but dispersible by means of certain wetting agents, sulfonated oils, or by special soaps, so as to form a perfect emulsion in aqueous solutions, thereby making for easy application in conjunction with the usual sizes or finishing mixtures.

(4) Free solubility in common petroleum solvents, thus permitting application by means of spraying, or by immersion in hydrocarbon solutions, such as waterproofing compounds, pigmented paints, rope and fishnet preservatives, etc.

(5) It must be unaffected by heat, by metallic surfaces contacted during finishing operations, or by any of the ingredients commonly used in sizing and finishing solutions.

(6) No noticeable odor, or color in the concentration required.

(7) No action on the textile fibers to be processed.

(8) No influence on subsequent dyeing or finishing operations.

(9) It should be highly bactericidal as well as fungicidal, for utmost protection of the fabric as well as the consumer.

(10) Freedom from industrial or pathological health hazards, i.e., harmless to the workingman who may come in manual contact therewith, and also to the user or wearer.

(11) To be useful over the widest range, it should be inexpensive in the concentration required for efficient and lasting protection.

The tabulation presented hereafter is partly based on tests conducted by the Shirley Laboratories, England, in 1930, and shows the mold-inhibiting effect of various chemicals on microorganisms commonly credited with being the most active in causing mildew on textile fibers, such as Aspergillus, Penicillium, Cytophaga, and Chaetomium. The minimum concentrations required represent effective fungicidal power after application. In practice, the concentrations applied to textiles are higher than the necessary minimum, depending on various factors, such as leaching out, wearing off, volatilization, or reduction by hydrolysis, of the respective mildewproofing substance. With other words, higher concentrations than theoretical quantities are used to obtain more lasting effects.

Growth Inhibited by Concentration of Antiseptic

Inorganic Compounds		
Ammonium Fluoride	0.04%	
Borax	0.9	
Copper (Metal present in salt)	0.11	
Mercuric Chloride	0.02	
Sodium Fluoride	0.8	
Sodium Silicofluoride	0.15	
Thallium Carbonate	0.02	
Uranium Nitrate	0.1	to 0.05
Zinc Chloride	0.8	
Zinc Hydroxide	1.0	
Organic Compounds		
Acetanilide	0.3%	
Acetylsalicylic Acid	0.1	
Acetyltribromophenol	0.02	to 0.01
Benzoic Acid (also Sodium Salt)	0.05	
Benzylated Orthochlorphenol	0.01	
Benzylated Cresylic Acid	0.1	to 0.05
Ortho- and Para- Benzyl Phenols	0.1	to 0.05
Ortho- Bromophenol	0.07	
4 Chloro - M - Cresol	0.05	
Ortho- Chlorophenol	0.08	
Cresol	0.1	
2:4 Dibromophenol	0.01	
2:4 Dinitrophenol	0.02	
Formaldehyde	0.05	
Naphthalene	0.25	
Para- Nitrophenol	0.017	
Pentachlorphenol	0.014	
Phenol	0.13	
Phenol (Sodium Salt)	0.20	
Salicylanilide	0.025	
Sulfo-Naphthenate (Sodium Salt)	0.05	
Thymol	0.04	
Tribromophenol	0.01	
2:4:6 Trichlorphenol	0.01	
Organic Mercury Compounds		
P- Acetoxy-mercuri-acetanilide	0.01	to 0.005
Chloromercuri - C - Cresol	0.01	to 0.005
Di-chloromercuri - O - Cresol	0.01	

Organic Mercury Compounds—cont'd

Chloromercuri - O - Phenol	0.015	to 0.008
Di-Mercuri-Chlornaphthylamine	0.01	to 0.005
Phenyl Mercury Nitrate	0.01	to 0.005

(The above minimum percentages are calculated for fungicidal power only.)

Among the inorganic compounds are a few substances, such as the fluorides, thallium carbonate, and mercuric chloride, which show high toxicity to fungal growths, but on close examination regarding the eleven requirements previously set forth score rather low.

In the group of organic compounds we find quite a range of substances showing high toxic effect toward fungi; outstanding in this group are the nitro- and halogen derivatives of phenol and cresol. In the large majority of cases, however, they fall short of meeting requirements Nos. 2, 5, 6 and 10.

Rather interesting from the standpoint of high bactericidal and fungicidal power are the organic mercury compounds. However, most of the hitherto known mercurials lack stability; i.e., they are liable to undergo reduction to metallic mercury under heat or other conditions, which also makes them toxic to higher animal life. Phenyl mercury nitrate is known to be *stable* in this respect; it is used mostly in medicine, for instance in concentration of 1:20,000 for the cure of ringworm, athlete's foot, and as an anti-syphiliticum, and it is non-toxic to higher animals. This substance would make a very efficient mildewproofing agent were it not insoluble in most organic solvents and not dispersible in water solutions, which makes it difficult to apply to textiles, quite aside from the high cost of around $60.00 per lb.

Di-mercuri-chlornaphthylamine will not reduce to metallic mercury under high heat, and exhibits utmost stability, both in its chemical and physical behavior. It does not volatilize more than fractionally below 220° F., and while it has a naphthalic odor, this is not noticeable in finished goods at the recommended concentration of 1:5,000 with respect to the weight of the fiber. This fungicide is soluble in petroleum solvents, but insoluble in body liquids or water. Nevertheless, it can be dispersed in water solutions with the aid of sulfonated oils, soaps, ammonium oleate or ammonium linoleate which offers a means of depositing it on textile fibers in a form not affected by the problem of solubility of the residual dispersing agent. It shares with phenyl mercury nitrate the property of being relatively harmless to humans. In textile operations, it can almost without exception be applied as part of another finishing operation, involving no extra labor cost, and the material cost in most instances is below 1/10th of one cent per pound of textile material treated.

New Bristling Filament

Exton, a bristling filament for use in toilet brushes, is announced by the Plastics Department of du Pont. Present production is limited and the entire output is being used in du Pont's own tooth brush manufacture. The new bristling filament is ultimately expected to replace the natural hog bristle which has heretofore been used in the best grades of toilet brushes. Made in the form of a plastic batch like dough, it is extruded through holes of the required size and can be made into strands of virtually any desired length. It is not softened by water or saliva. Its stiffness can be controlled accurately in the making through a variation of the diameter of the hole. This new synthetic product is said to be superior in appearance and has much longer life than the natural bristle.

Anti-foaming Agent

Octyl alcohol (2 ethyl-hexanol), used in small but definite proportions, is claimed by Carbide & Carbon Chemicals Corp. to be a valuable anti-foaming agent effecting important economies in industrial operations where foaming is a problem. Announcement issued by company stated that too high concentrations may increase foaming instead of preventing it. The optimum concentration for foam prevention is approximately that forming a saturated solution—0.14 per cent. by weight of octyl alcohol in water at 25° C.

Typical applications of the value of octyl alcohol in this way show increased capacity of equipment or improved quality of product through reduction of foaming. Capacity of equipment for dehydrating lubricating oil in reclaiming is doubled by the addition of 0.5 pound octyl alcohol per thousand gallons of oil containing two per cent. moisture, and the time of dehydration is reduced from seven hours to one hour. The addition of three ounces of octyl alcohol to 900 gallons of solution of a diazo compound stopped foaming and allowed the size of the batch treated in a 1500-gallon tank to be increased from 500 to 900 gallons. In textile printing small amounts of octyl alcohol offset the tendency of other compounds in the dye paste to cause foaming. Similar good results have been realized by adding octyl alcohol to air-conditioning sprays in which a wetting agent, added to increase efficiency, caused excessive foaming. Other applications are in the prevention of foaming in paper manufacture, gelatin coating, photographic processing, and numerous other cases where foaming is objectionable. The quantities of octyl alcohol required are so small as to make its addition a negligible item of cost.

Trade Mark Descriptions (Continued from Page 176)

406,186. International Printing Ink Corp., New York City; May 10, '38; printing inks; use since Apr. 23, '38.

406,257. Lucidol Corp., Buffalo, N. Y.; May 12, '38; compounds or mixtures containing organic peroxides in combination with organic or inorganic fillers or diluents; use since Apr., '38.

406,284. Eastman Kodak Co., Jersey City, N. J., and Rochester, N. Y.; May 13, '38; grease adapted for use in sealing removable parts of vacuum apparatus; use since Dec. 23, '37.

406,291. E. F. Houghton & Co., Phila.; May 13, '38; core oil; use since May 2, '38.

406,300. Neva-Moth Corp. of America, New York City; May 13, '38; chemical process for shrinking and sterilizing textiles, and other fabrics; use since May 6, '38

406,346. Mound City Paint & Color Co., St. Louis, Mo.; May 14, '38; flat finish varnish; use since Oct. 31, '20.

406,347. Mound City Paint & Color Co., St. Louis, Mo.; May 14, '38; flat wall paint; use since Jan. 31, '38.

406,358. Turco Products, Inc., Los Angeles, Calif.; May 14, '38; glass cleaning preparations; use since June 1, '37.

406,430. New Hampshire Diatomite Co.; Portsmouth, N. H.; May 17, '38; filler for rubber, asphalt, etc.; use since Mar. 30, '38.

406,463. Max B. Miller & Co., New York City; May 18, '38; aluminum earth filtering materials, particularly for treating oils; use since May 6, '38.

406,468. W. (Walter) H. Runyan, Rapid City, S. D.; May 18, '38; anti-freeze solution for gasoline motor radiators; use since June 1, '37.

406,541. Geo. B. Allen (The Charpure Co.), Decatur, Ga.; May 20, '38; metal polish; use since May 2, '38.

406,598. James Metcalf Murray, Garden City, N. Y.; May 21, '38; commercial fertilizer; use since Feb. 1, '38.

406,639. General Chemical Co., New York City; May 23, '38; insecticides and fungicides, etc.; use since Jan., '30.

406,656. Arretis Bros. (Win-Brite Co.), Muncie, Ind.; May 23, '38; preparation for cleaning windows and windshields; use since Apr. 28, '38.

406,733. Sherwin-Williams Co., Cleveland, O.; May 25, '38; all kinds of paints; use since Mar. 11, '38.

406,845. Jacques Wolf & Co., Clifton, N. J.; May 27, '38; compound for baiting skins or hides; use since Apr. 17, '34.

406,964. E. I. du Pont de Nemours & Co., Wilmington, Del.; June 1, '38; chemicals used in manufacture of lubricants; use since Apr. 4, '38.

407,186. General Chemical Co., New York City; June 7, '38; fungicides; use since May 11, '38.

404,446. Jas. E. Moon, New York City; Mar. 24, '38; gunsight blackening candles, bullet lubricants; colloidal graphited oil; use since Mar. 17, '38.

406,079. Luvos Clay Co. of America, Los Angeles; May 6, '38; dieti-cum clay; use since Nov. 5, '37.

405,971. Roselux Chemical Co., New York City; May 3, '38; cleaning compound; use since Dec. 1, '35.

403,401. Gerald B. Dyde, Portland, Ore.; Feb. 25, '38; textile waterproofing composition; use since Nov. 1, '37.

405,878. B. Heller & Co., Chicago; Apr. 30, '38; bedbug exterminator; use since Apr. 14, '38.

406,019. Eastman Kodak Co., Jersey City, N. J., and Rochester, N. Y.; May 5, '38; high boiling oily esters; use since Apr. 13, '38.

406,045. Murray Baum (Baum Prods. Co.), Ashton, Idaho; May '38; solution for removing bugs from windshields and fenders of automobiles; use since Mar. 9, '38.

375,768. A. M. Meinecke & Sons, Inc., Chicago; Mar. 9, '36; powdered material for coating, filling or treating printed paper; use since Oct. 14, '35.

375,769. A. M. Meinecke & Son, Chicago; Mar. 9, '36; powdered material for coating, filling or treating printed paper; use since Oct. 14, '35.

385,154. Roy E. Schneider (Alder Prods. Co.), Kansas City, Mo.; Nov. 4, '36; specialized lubricating and penetrating oil; use since July 3, '34.

392,675. Richard Boettner (Wonder Prods. Co.), Salt Lake City, Utah; May 13, '37; furniture and like purposes polish; use since Apr. 15, '36.

393,316. Champion Chem. Wks., Inc., New York City; May 27, '37; chlorinated lime; use since 1888.

393,317. Champion Chem. Works, New York City; May 27, '37; chlorinated lime; use since Jan., 1895.

398,622. Harold Gray Jarvis, Portland, Ore.; Oct. 18, '37; sterilizing detergent for household, laundry and hospital use; use since July, 1931.

399,070. Geo. S. Brown, Jr. (Coastal Chemical Co.), Savannah, Ga.; Oct. 29, '37; preparation for cleaning window glass; use since Oct. 11, '37.

399,201. Niels Rasmussen & H. Schiotz, Frederiksberg, near Copenhagen, Denmark; Nov. 1, '37; mixture organic adhesive and a mineral filling of granulous or fibrous nature for use as a covering surface for roofs, etc; use since 1935.

399,229. Globe Oil & Refining Co., Wichita, Kans.; Nov. 2, '37; lubricating oils and greases and gasoline; use since 1933.

399,514. Phosphate Mining Co., New York City; Nov. 9, '37; detergent and cleanser, having water conditioning properties; use since Oct. 28, '37.

400,305. Kenite Lab., Inc., New York City; Nov. 30, '37; pipe joint compounds; use since Aug. 7, '37.

400,318. Nyanza Color & Chemical Co., New York City; Nov. 30, '37; chemicals and dyes for textiles; use since 1923.

401,002. Standard Oil Co. of N. J., Wilmington, Del.; Dec. 17, '37; lubricating oils and greases; use since Sept. 9, '37.

401,327. Armstrong Cork Products Co., Lancaster, Pa.; Dec. 29, '37; resin type adhesives; use since Sept. 10, '37.

401,361. Ida E. Siefen (J. J. Siefen Co.), Detroit, Mich.; Dec. 29, '37; abrasive bond in paste-like form for setting up polishing wheels and belts; use since Dec. 15, '36.

401,533. Mar-Vin Dispenser & Prods. Co., New York City; Jan. 4, '38; dish washing compounds and powders; use since Aug. 1, '37.

401,580. Mallinckrodt Chemical Works, St. Louis, Mo.; Jan. 5, '38; moth and roach killers in powder form; use since Apr., '35.

402,371. Glencoe Lime & Cement Co., St. Louis, Mo.; Jan. 27, '38; lime; use since Mar. 26, '36.

401,909. Willis Earl Simpson (One Spot Co.), Elkridge, Md.; Jan. 14, '38; rat killing preparation; use since Jan. 1, '38.

402,119. Ever-Plastics Corp., New York City; Jan. 20, '38; synthetic compound for use as filler between stone, wood, metal, etc.; Oct. 30, '37.

402,354. U. S. Aviex Corp., Long Island City, N. Y.; Jan. 26, '38; lubricating oil; use since Apr. 20, '36.

402,565. Humble Oil & Refining Co., Houston, Tex.: Feb. 1, '38; ready mixed paints and enamels; use since Sept. 15, '37.

402,839. John Acquisto, Jamaica, L. I., N.Y.; Feb. 9, '38; bluing fluid for layout work on steel; use since Nov., '37.

402,927. Auto-Lec Stores, Inc., New Orleans, La.; Feb. 11, '38; lubricating oils; use since 1935.

403,537 Betzold Bros., Phila.; Mar. 1, '38; preparation for softening fur garments; use since Feb. 1, '37.

403,720. Crown Products Corp., San Francisco; Mar. 5, '38; cleansing powder for toilet bowls, sinks and other such surfaces in the house; use since Dec. 21, '37.

404,150. Jacques Wolf & Co., Clifton, N.J.; Mar. 16, '38; catalyst of fungus origin, having various adaptations; i.e., desizing textile fabrics; use since Jan. 24, '38.

403,748. American K. A. T. Corp., New York City; Mar. 7, '38; compound to be used with water for removal scale and impurities and other harmful substances in boilers and pipes; use since Jan., '37.

404,005. Meyer-Blanke Co., St. Louis, Mo.; Mar. 12, '38; solvents and compounds for cleaning and washing glass, wood, and metals; use since Mar. 3, '38.

403,997. Leland Curtis, Los Angeles, Calif.; Mar. 12, '38; ski wax; use since Jan. 18, '38.

404,282. Allentown Paint Mfg. Co., Allentown, Pa.; Mar. 19, '38; paints, varnishes, etc.; use since Nov. 12, '37.

404,313. International Filter Co., Chicago; Mar. 21, '38; ion exchanging and adsorptive materials; use since Mar. 17, '38.

404,543. Prim Corp., St. Louis, Mo.; Mar. 26, '38; cleaner for painted and enameled surfaces, walls, refrigerators, blinds, etc.; use since Feb. 8, '38.

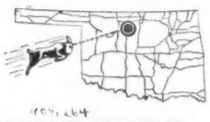
404,647. A. Gusmer, Inc., Hoboken, N. J.; Mar. 30, '38; brewers' tank cleaning preparation; use since Mar. 25, '38.

404,706. General Paint & Varnish Co., Chicago, Ill.; Mar. 31, '38; ready mixed paints, paste and flat paints, and paint enamels; use since Jan. 1, '28.

404,758. Heatbath Corp., West Springfield, Mass.; Apr. 1, '38; salt compositions for treating metal baths; use since June 1, '37.

404,843. Harold B. Eyrich, Custer, S. D.; Apr. 4, '38; magnesium calcium silicate containing fluorine; use since Dec. 3, '37.

† Trade-marks reproduced and described cover those appearing in the *U. S. Patent Gazettes*, June 28 through middle week July 26, inclusive.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HYDEGRE
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INTERNATIONAL
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Hi-Seal
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CLICK
405,634

PRUFOL

PLASTAID
405,841

MopAco
405,853

POLARIS ENAMEL
405,854

TEMU
405,862

AQUAMASTIQUE
405,911

E-Z Wipe
405,870

HUMIDUST

Laughs at Rain
405,901

405,942

LARVABAN MOTH ELIMINATOR
405,944

JEWELGLO
405,948

NITRODOL
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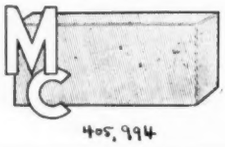
UNAFINE
405,973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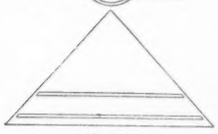
406,061

PIPEMASTER
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CARBONIL
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GLORAY
406,186

LUPERCO
406,257

CELVACENE
406,284

HY-TEN CORE OIL
406,291

"Sani-Shrunk"
406,300

EXELAGON FLAT FINISH-VARNISH
406,346

IMPERVAKOTE
406,347

GLYST
406,358

OPALEX
PARATEX
406,430

X-YTE
406,463

NO-IC
406,468

SPIC AND SPAN
406,541

ORGANIX
406,598

BC
406,639

Win-Brite
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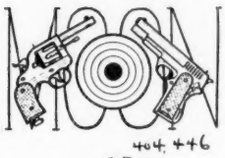
KOTO-KROME
406,733

FUNGIZYME
406,845

ORTHOLEUM
406,964

SPRAYCOP
407,186


404,446

LUVOS CLAY
406,079

ROSE-X
405,171

DRYOLENE
403,401

405,878

AMOIL
406,01

BUG-BOO
406,045

404,898. Karl Jacobi (Chemico Labs.), Cranford, N. J.; Apr. 5, '38; soluble sulfur; use since Nov. 15, '37.

404,864. Neva-Moth Corp. of America, New York City; odorless mothproofing compound for furs, yarns, woolens, draperies, etc.; use since Mar. 30, '37.

404,948. Wm. S. Merrell Co., Cincinnati, O.; Apr. 6, '38; disinfectant, antiseptic, germicide; use since Mar. 24, '38.

404,988. Hammond Paint & Chem. Co.; Beacon, N. Y.; Apr. 7, '38; insecticides; use since Nov. 10, '36.

405,085. Stauffer Chem. Co. of Tex.; Freeport, Tex., and New York City; Apr. 9, '38; sulfur; use since Apr. '28.

405,128. Paragon Oil Co., Inc., Brooklyn, N. Y.; Apr. 11, '38; cutting and lubricating oils and greases; use since Jan. 21, '38.

405,132. Richmond Wood Working Co., Richmond, Va.; Apr. 11, '38; embalming fluids and preparations for preserving and beautifying the dead; use since Mar. 4, '38.

405,139. Tank Seal Prods. Co., Tulsa, Okla.; Apr. 11, '38; plastic tank cement, petroleum-proof metal coating, insulation weather coat, etc.; use since Apr. 22, '27.

405,162. Ivoroid Mixed Paint Co., Newark, N. J.; Apr. 12, '38; barn and roof paint; use since May 27, 1914.

405,207. Humble Oil & Refining Co., Houston, Tex.; Apr. 13, '38; rust preventives, compounds used as corrosion-inhibiting, heat-resisting, and gasproofing coatings, and solvents; use since Mar. 9, '38.

405,208. Humble Oil & Refining Co., Houston, Tex.; Apr. 13, '38; coating asphalts; use since Mar. 9, '38.

405,209. Humble Oil & Refining Co., Houston, Tex.; Apr. 13, '38; coatings in nature of lubricating liquids and greases; use since Mar. 9, '38.

405,241. Dow Chemical Co., Midland, Mich.; Apr. 14, '38; compositions comprising ethyl cellulose and wax, for coating paper, etc.; use since Mar. 3, '38.

405,246. F. Freithofer Mfg. Co., Pittsburgh, Pa.; Apr. 14, '38; germicide and antiseptic; use since Mar. 15, '38.

405,250. R. M. Hollingshead Corp., Camden, N. J.; Apr. 14, '38; preparations for cleaning radiators and motor cooling systems and drain pipes, and also for other like purposes; use since May 14, '34.

405,251. R. M. Hollingshead Corp.; Camden, N. J.; Apr. 14, '38; lubricants, lubricating greases anti-corrosive oils, etc.; use since May 16, '34.

405,264. A. Phillips Service, Newkirk, Okla.; Apr. 14, '38; motor lubricating oil; use since Apr. 5, '38.

405,468. Jos. A. Tumbler (J. A. Tumbler Labs.), Balto., Md.; Apr. 19, '38; preparation for degreasing and cleaning cement floors, auto chassis, truck bodies, grease pits, etc.; use since Sept., 1914.

405,488. Distillers Co., Ltd., Edinburgh, Scotland; Apr. 20, '38; liquid fuel for internal combustion engines; use since Feb. 14, '37.

405,537. National Adhesives Corp., New York City; Mar. 26, '38; glues, adhesives, starches and similar products; use since Mar. 15, '38.

405,601. Histosan, Inc., Ivoryton, Conn.; Apr. 22, '38; preparation for polishing and sealing floors; use since Dec. 13, '37.

405,634. Dri-Brite, Inc., St. Louis, Mo.; Apr. 23, '38; cleaner for woodwork, painted and enameled surfaces; use since Mar. 15, '38.

405,713. Boston Drug & Chemical Co., Boston, Mass.; Apr. 26, '38; liquid mothproofing preparation; use since Apr. 1, '38.

405,841. Binney & Smith Co., New York City; Apr. 29, '38; compound for softening rubber and similar materials; use since Apr. 14, '38.

405,853. Mound City Paint & Color Co., St. Louis, Mo., Apr. 29, '38; semi-gloss paint; use since May 31, '35.

405,854. Mound City Paint & Color Co., St. Louis, Mo.; Apr. 29, '38; paint enamel; use since Oct. 31, '20.

405,862. Max Wulfsohn, Inc., New York City; Apr. 29, '38; soap; use since May 15, '37.

405,911. John Guy Britton, Lansdowne, Pa.; May 2, '38; sound absorbent plastic material in dry, liquid, and rigidly set forms; use since Mar. 9, '38.

405,870. Beauty Kote Corp., Newark, N. J.; Apr. 20, '38; varnish; use since May 25, '35.

405,901. Stauffer Chemical Co., New York City, and San Francisco, Calif.; Apr. 30, '38; insecticides and fungicides; use since May, '37.

405,942. Sunset Oil Co., Los Angeles, Calif.; May 2, '38; petroleum products; use since Feb., '38.

405,944. August Trautman, New York City; May 2, '38; moth exterminating preparation; use since Apr. 14, '38.

405,948. Miriam Weingarten (Milton Weingarten Co.), San Francisco, Calif.; May 2, '38; jewelry cleaner; use since Mar. 30, '38.

405,953. Virginia-Carolina Chem. Corp., Richmond, Va.; May 31, '38; commercial fertilizers; use since Apr. 14, '38.

405,973. Universal Atlas Cement Co., Chicago, May 3, '38; Portland cement; use since July 7, '37.

405,994. Marquette Cement Mfg. Co., Chicago, May 4, '38; masonry cement; use since Jan. 2, '38.

406,018. Eastman Kodak Co., Jersey City, N. J., and Rochester, N. Y.; May 5, '38; high boiling oily esters, such as 2-ethyl hexyl phthalate, 2-ethyl hexyl sebacate, etc.; use since Apr. 7, '38.

406,047. Bray Chem. Co., Chicago, Ill.; May 6, '38; lye; use since Mar. 31, '37.

406,061. J. F. Kurfees Paint Co., Louisvillle, Ky.; May 6, '38; mixed paint, paste paint, enamel paint, and other paint products; use since Feb. 12, '38.

406,046. Bray Chem. Co., Chicago; May 6, '38; drain pipe cleaner in crystal form; use since July 13, '37.

406,089. Carbonil Co., Oakdale, Pa.; May 7, '38; compound for enriching gasoline; use since Apr. 21, '38.

Continued on page 174

THE PROGRESS OF A *Flavor*

The story of Vanilla begins in the dim days of the Middle Ages when the seed pods of tropical orchids, highly prized for their delicate aroma and flavor, were first sold in the colorful shops of the medieval apothecaries. The name, then, of this desirable flavor, was *Vainilla* (Spanish for "small pod"), and these seed pods were its sole source of supply.

Vanilla continued to be made from the varieties of this valuable but limited supply of orchids until the time of our grandfathers, when it was discovered that Vanillin, a principal constituent of Vanilla, could be produced from oil of cloves or cinnamon leaf oil. Even today, Vanillin from Eugenol, derived from clove oil or other sources, is still produced and sold commercially.

But, in the beginning of the last decade, it became apparent that some new source of Vanillin must be found if this useful flavor was to be continually supplied at stable and economically low costs, for cloves gyrated up and down in price. In fact, the price of cloves at times sent the price of Vanillin up as high as $6.50 to $8.50 a pound.

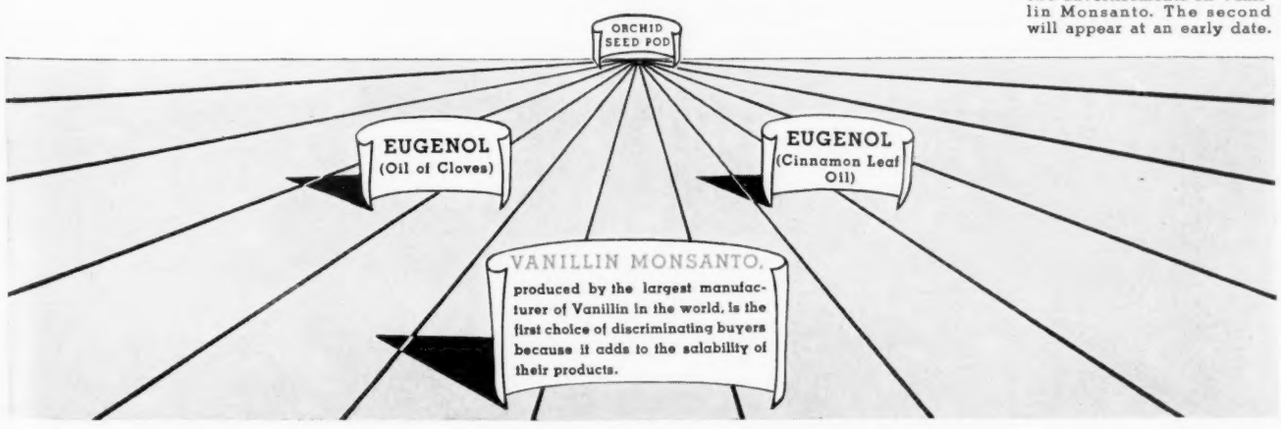
So Monsanto spent large sums of money in their own chemical research laboratories to discover new improvements and refinements. By adding this new information to the years of accumulated knowledge and research, Monsanto was able to present, almost ten years ago to the day, a new Vanillin, created from the basic elements of carbon, hydrogen and oxygen, so exactly duplicating Vanillin produced from the original sources that chemists detect no difference in it.

Today, this steady progress through the years has resulted in Monsanto producing a Vanillin of the highest degree of purity, aroma and flavor – an economical product of quality to meet the ever-increasing demand – VANILLIN MONSANTO.

We solicit your inquiries for this and other Monsanto products.

Monsanto Chemical Company
St. Louis, U.S.A.

This is the first in a series of two advertisements on Vanillin Monsanto. The second will appear at an early date.


ORCHID SEED POD
EUGENOL (Oil of Cloves)
EUGENOL (Cinnamon Leaf Oil)
VANILLIN MONSANTO,
produced by the largest manufacturer of Vanillin in the world, is the first choice of discriminating buyers because it adds to the salability of their products.

'STANDARD

BICHROMATES

BICHROMATE OF SODA

BICHROMATE OF POTASH

CHROMATE OF SODA

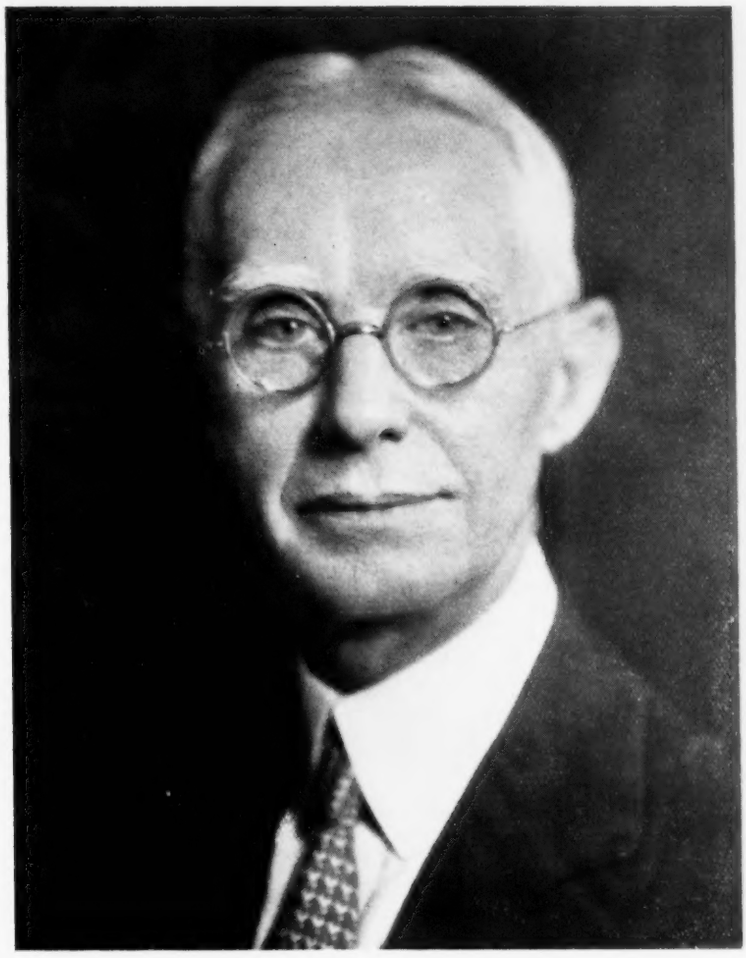
PRIOR CHEMICAL CORP.

420 LEXINGTON AVENUE • NEW YORK

Sole Selling Agents for

STANDARD CHROMATE DIVISION

Diamond Alkali Company, Painesville, Ohio



Charles Holmes Herty

1867—1938

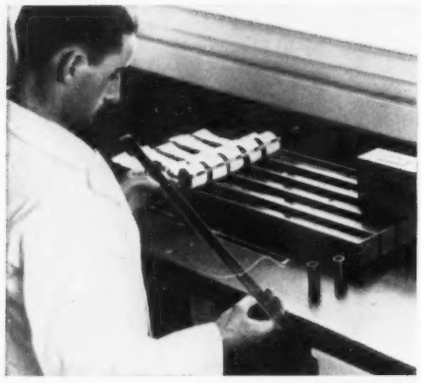
Both American science and American industry would be incomparably poorer if we never had Dr. Herty. For he bound together within a winning personality a rare combination of valuable talents which he unstintingly devoted to the common good. He was a chemist with a vision tempered with a sound sense of realities.

Born in historic Milledgeville, he was first trained at the University of Georgia; received his doctorate from Johns Hopkins, and did post-graduate work both at Berlin and Zurich. After a year in Experimental Station work, and with two years interruptions when he was with the U. S. Bureau of Forestry and the Chattanooga Pottery, he taught chemistry at his alma mater, resigning in 1916 to serve till 1921 as Editor of *The Journal of Industrial and Engineering Chemistry*. For the next five years he was President of the Synthetic Organic Chemical Manufacturers' Association; then for two years Industrial Adviser to The Chemical Foundation; and since 1932 Director of the Savannah Pulp and Paper Laboratory.

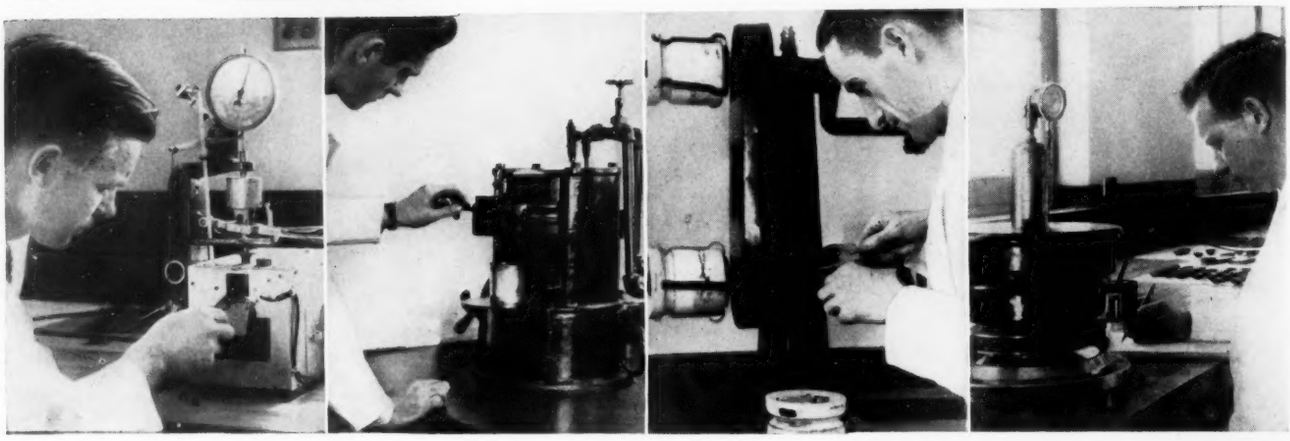
Behind these bare facts of his career lies a story of scientific and patriotic devotion without equal in our times and a record of accomplishment to which we are all his grateful heirs. To his chosen profession he rendered not only long, faithful, public service; but by precept and example he at once popularized and dignified the name of "chemist" to all his fellow countrymen. He was the god-father of the American dyes industry. To his beloved South he made notable, chemico-economic contributions in better methods for the naval stores industry and in entirely new processes for the use of southern pinewoods in the manufacture of paper and rayon. And all of these accomplishments have enriched not only all chemists, the chemical industry, and the southern states; but also the entire nation and every American citizen.

All this was just what he most eagerly wanted, for while he was by birth a Southern gentleman and by training a chemical technician, he was before all else a patriotic American chemist.

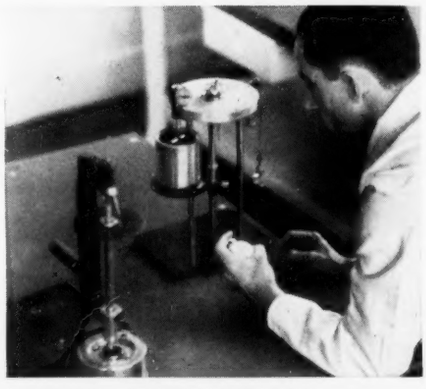
Proving Black is Black

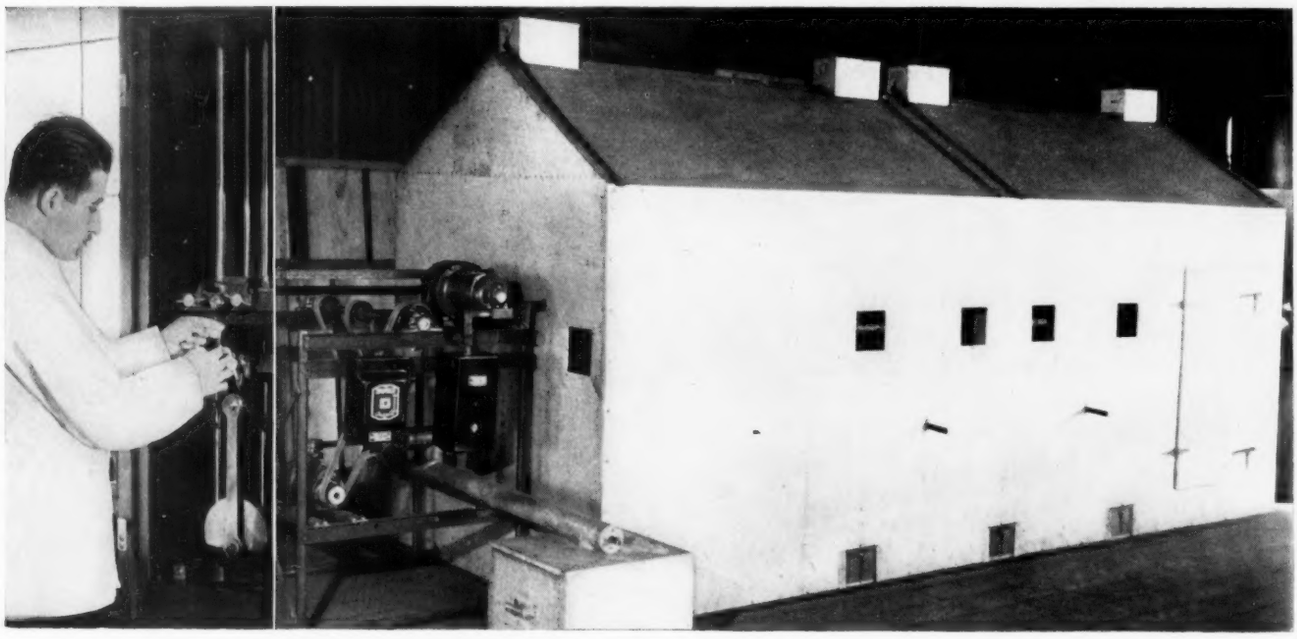


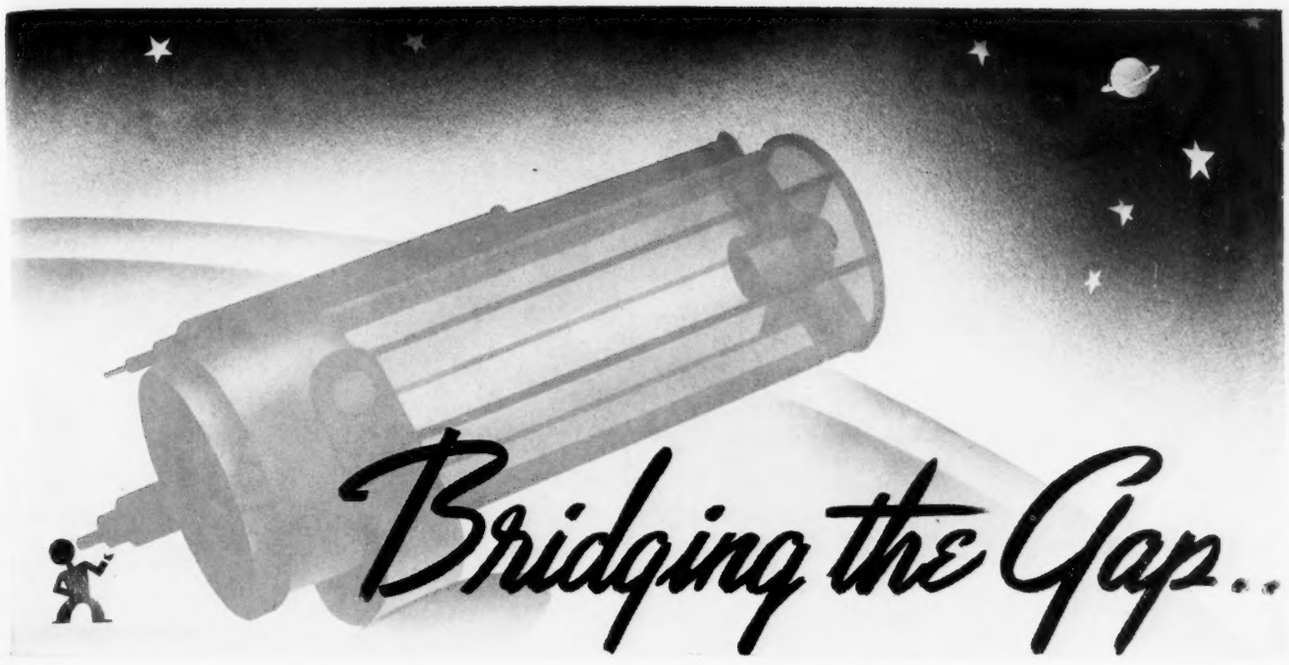
These unusual photographs were taken in the Carbon Research Laboratory of Columbian Carbon. Special laboratories are devoted to paint, ink, rubber and plastic technology and include, in addition to semi-plant manufacturing equipment, special apparatus for chemical and physical testing of colloidal carbon and products made with it. Top, left, the Dryograph tests the drying of paints, lacquers, inks and enamels. A film of definite thickness is spread on the metal strip. The canton flannel strip, unrolled at very slow uniform speed, sticks to the film until it dries.



Above, left to right, the Goodrich Plastometer tests the effects of temperature on rubber samples. Grinding paints or inks is done on a water cooled buhr-stone mill. Ball mills supplement stone and roller mills in grinding inks, paints, and enamels. The Schopper detrition machine is used to study the effects of rolling pressure on rubber samples. Right, opposite, viscosity of paints and inks is carefully checked on a Stormer or a McMichael viscosimeter. Below, left, testing the life of rubber samples with a De Mattia flexing machine. Right, the only carbon black producing plant in the East—the miniature carbon black burning house. This pilot plant is used to study the process of manufacture of colloidal carbon.







Through the science of astronomy, distant worlds are linked together, and the mysteries of space reduced to indisputable facts. Research chemistry likewise bridges the gaps between the known and the unknown, using strange or familiar compounds to convert theories into tangible results.

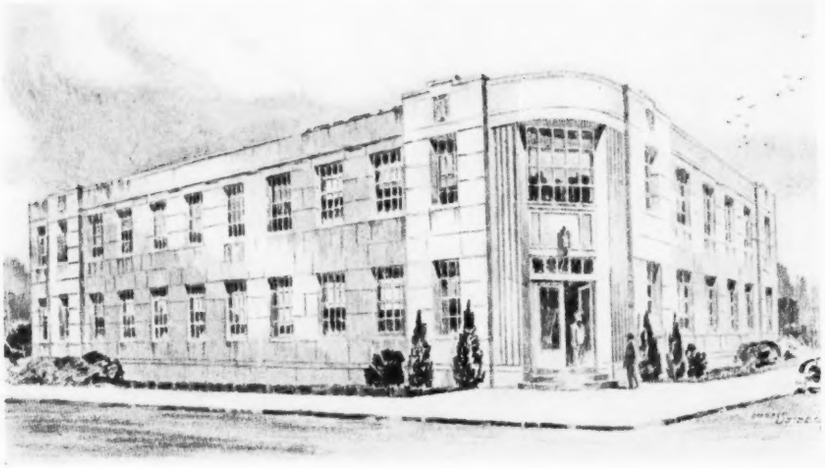
The Sharples Synthetic Organic Chemicals listed here are helping to "bridge the gap" between experiment and actual production. A 64-page Booklet giving detailed descriptions and uses of these Compounds has won the approval of research chemists and technical directors in every industry where chemicals are used. Why not write today for yours? It may be the means of shortening the tedious process steps that enter your particular problem.

SHARPLES TRADE MARK SOLVENTS

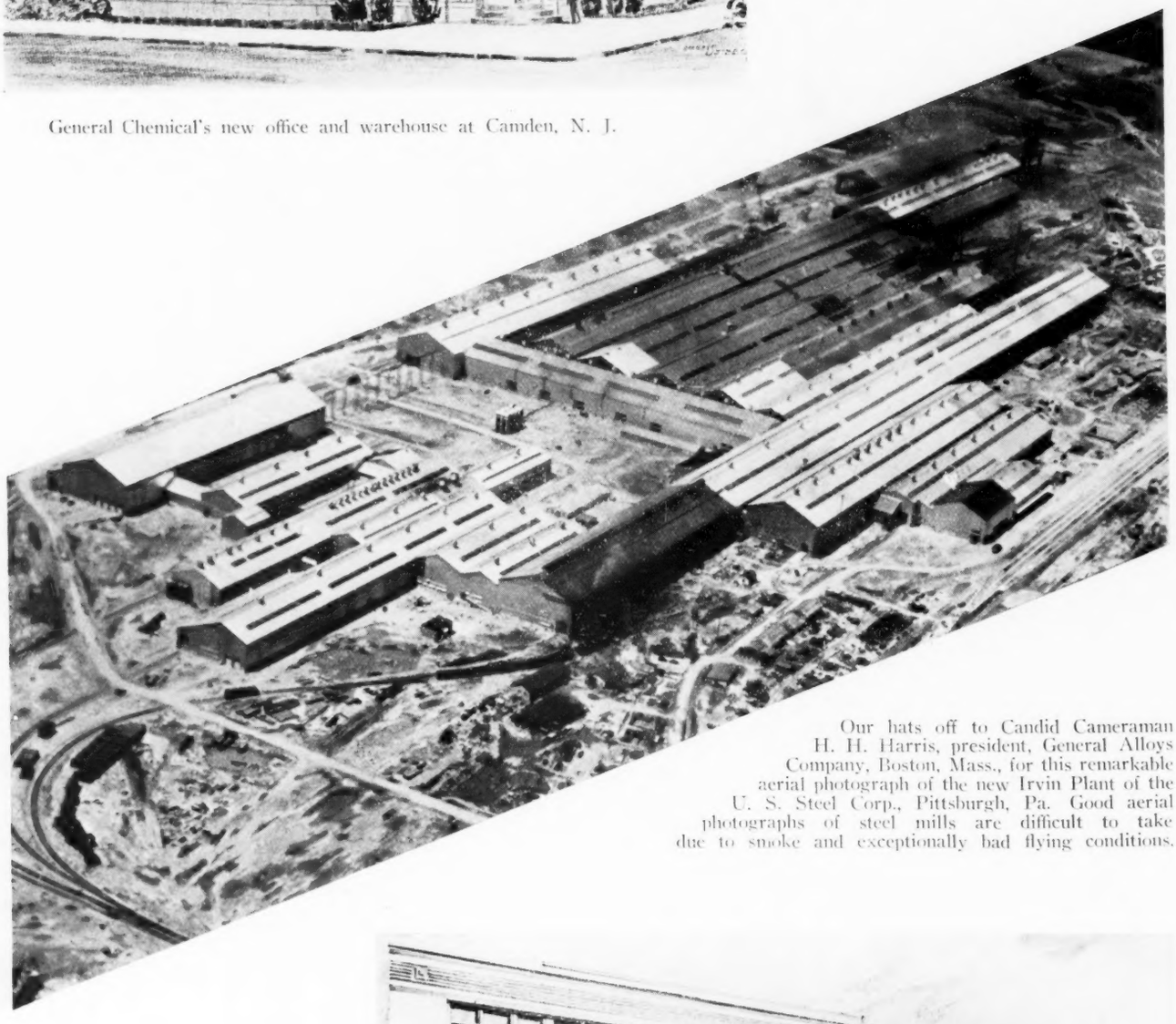
*Pentasol (Pure Amyl Alcohol)	Ortho Amyl Phenol	Normal Butyl Chloride
*Pent-Acetate (100% Amyl)	Monoamylamine	Mixed Amyl Chlorides
Normal Butyl Carbinol	Diamylamine	Dichloropentanes
Isobutyl Carbinol	Triamylamine	Amyl Mercaptan
Sec-Butyl Carbinol	n-Monobutylamine	Diamyl Sulphide
Methyl Propyl Carbinol	n-Dibutylamine	*Pentalarm
Diethyl Carbinol	n-Tributylamine	Amylenes
Dimethyl Ethyl Carbinol	Monoamyl Naphthalene	Diamylene
Tertiary Amyl Alcohol	Diamyl Naphthalene	Amyl Benzenes
*Pentaphen (p-Tertiary Amyl Phenol)	Polyamyl Naphthalenes	Diamyl Ether
Diamyl Phenol	Mixed Amyl Naphthalenes	SEMI-COMMERCIAL PRODUCTS
	Normal Amyl Chloride	LABORATORY PRODUCTS
		*Trade Mark Registered

SHARPLES SOLVENTS

THE SHARPLES SOLVENTS CORP., 23rd and Westmoreland Streets, Philadelphia, Pennsylvania



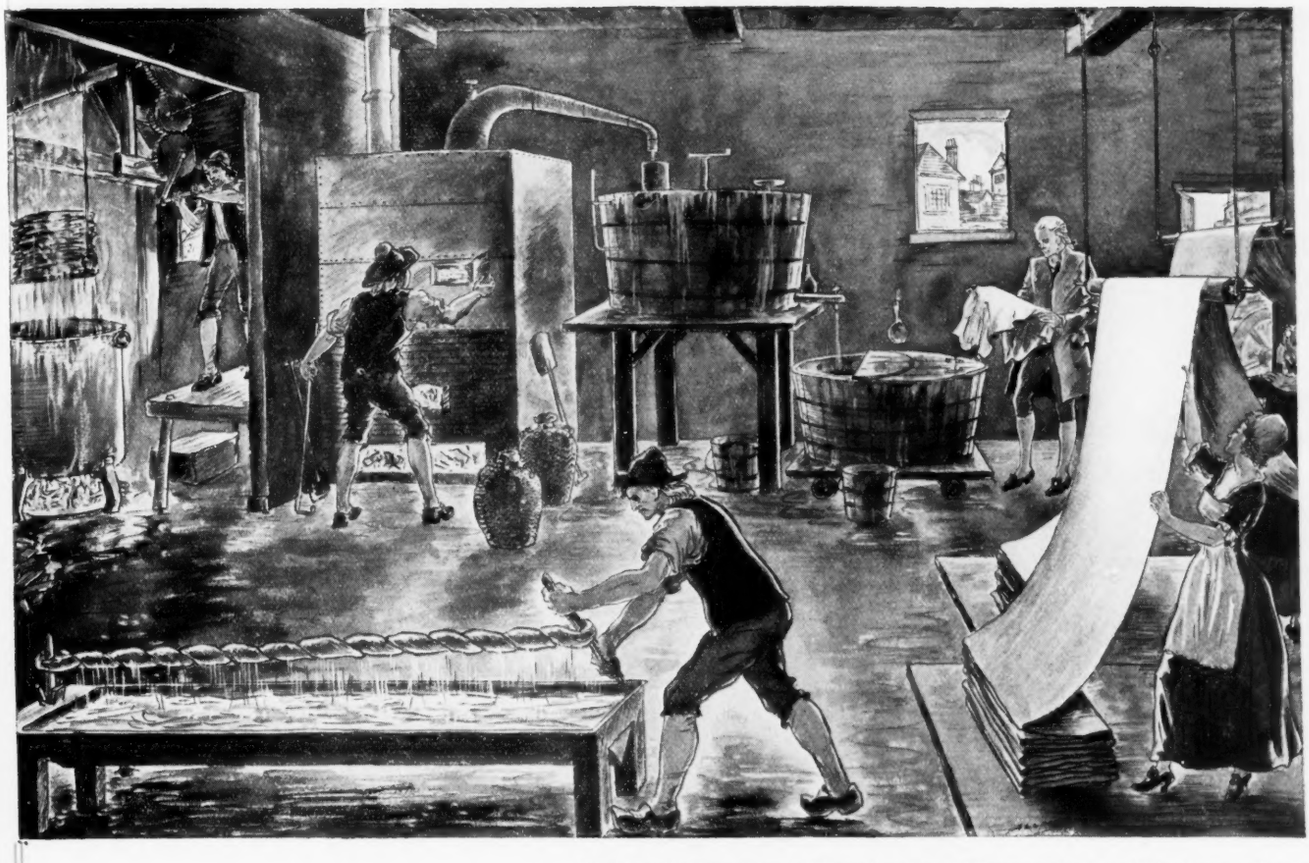
General Chemical's new office and warehouse at Camden, N. J.



Our hats off to Candid Cameraman H. H. Harris, president, General Alloys Company, Boston, Mass., for this remarkable aerial photograph of the new Irvin Plant of the U. S. Steel Corp., Pittsburgh, Pa. Good aerial photographs of steel mills are difficult to take due to smoke and exceptionally bad flying conditions.

Proposed addition to the Case School of Applied Science in Cleveland. Construction will be started this summer.

Through The Centuries With Alkalies



Making the First Liquid Bleach or Javel Water at the Javel Works near Paris

The value of chlorine for bleaching textiles and paper has been known for over 100 years. In 1787 it began to replace lyes and sunshine for bleaching but was difficult to use till 1792 when "Eau de Javelle" or soda bleach liquor was introduced at the Javel works near Paris. A few years later "chloride of lime", a bleaching powder containing 35% available chlorine was introduced by Charles Tennant of Glasgow.

When we close a contract for COLUMBIA LIQUID CHLORINE or any other COLUMBIA product, we by no means consider our task finished. Your money brings you more than just so much Liquid Chlorine, Soda Ash or Caustic Soda.

Back of every shipment is a sincere determination to supply you with nothing but the best . . . to understand and meet your requirements in every detail . . . to have your order delivered safely and free from impurities, in perfect, trouble-proof containers . . . in short, to see the job through.

COLUMBIA LIQUID CHLORINE is shipped from our Barberton, Ohio plant in 16 and 30 ton single unit and 15 ton multiple unit tank cars of latest design; also in 100 and 150 lbs. cylinders.

COLUMBIA

SODA ASH
CAUSTIC SODA
SODIUM BICARBONATE
MODIFIED SODAS
LIQUID CHLORINE
CALCIUM CHLORIDE

THE COLUMBIA ALKALI CORPORATION
BARBERTON • OHIO

NEW YORK · ST. LOUIS · CLEVELAND · CHICAGO · PITTSBURGH · MINNEAPOLIS · BOSTON · CINCINNATI · PHILADELPHIA

The new "gun-camera" with which split-second accuracy is possible. The dog and ball shown here is one of its slower shots. Progress in photography, however, has been due not only to better equipment, faster lenses, and new emulsions, but also to improvements in photographic chemicals as typified by Mallinckrodt Photo Purified Chemicals.

MALLINCKRODT

PHOTOGRAPHIC CHEMICALS

Among the Mallinckrodt photographic products are Sodium Sulfite Anhydrous Photo, Hydroquinone, PICTOL*, HYPORICE*, Sodium Carbonate Photo, Potassium Bromide, and Silver Nitrate.

The manufacture of an outstanding group of photographic chemicals indicates how Mallinckrodt products are tailor-made to meet the needs of specific industries. In the same way Mallinckrodt manufactures chemicals specifically intended for pharmaceutical, analytical and industrial needs.

ATTENTION
Amateur Photographers:
If photography is your hobby, write for special information about Mallinckrodt photographic chemicals.

Mallinckrodt

CHEMICAL WORKS

*T. M. Reg. U. S. Pat. Off.

2nd and Mallinckrodt Streets
St. Louis, Mo.

72 Gold Street
New York, N. Y.

CHICAGO MONTREAL
PHILADELPHIA TORONTO

MAKERS OF FINE CHEMICALS SINCE 1867

TVA PROBE OPENS

Alteration of the Minutes of the TVA Charged—Deposed Chairman, A. E. Morgan, Reiterates Earlier Charges—Curtis Warmly Defends Purchase of Phosphate Properties from I.A.C.—

The Congressional committee investigating TVA formally started to function last month and within a very short period acrimonious accusations were being hurled back and forth with utter abandon. There is every reason to believe that the current investigation will be one of the most bitter in the annals of Congress. Highlights so far were the testimony of deposed chairman, Dr. A. E. Morgan, and that of Dr. Harry A. Curtis, chief chemical engineer and head of the fertilizer department.

The real fireworks blazed up on July 21 when the committee impounded all the minutes of the TVA board of directors since the first meeting on July 16, 1933, and a special file of "changed" minutes, consisting of the original and altered versions of the records of 15 or 20 board meetings.

This action was taken on the motion of Rep. Thomas A. Jenkins, Ohio Republican, after Charles Hoffman, assistant secretary of the Authority in charge of keeping the minutes, testified that James L. Fly, general counsel for TVA, and Francis H. Biddle, chief counsel for the committee, had questioned him about the minutes after he had discussed them with Dr. Arthur E. Morgan, deposed chairman.

Mr. Hoffman was one of two TVA employes allowed to talk with Dr. Morgan by special permission from TVA authorities after orders were issued to the personnel, as Mr. Fly admitted, against talking with Dr. Morgan without notifying their superiors.

Mr. Hoffman testified that the file contained 15 or 20 changed minutes, and that most of the changes had been directed by David E. Lilienthal, TVA director in charge of the power program.

Three days earlier Dr. A. E. Morgan, testifying at the air-conditioned federal court house in Knoxville, charged that the TVA board of directors had wasted millions of dollars in its power and agricultural programs.

He further charged that the TVA faced the loss of many more millions because of contracts entered into over his dissents before his dismissal by President Roosevelt recently for "contumacy."

Senator Frazier and Representative Wolverton took the lead in close questioning of Dr. Morgan on his failure to vote against the yardstick rates or enter his objections to them formally on the record of the TVA board.

He replied that he had had to decide, at the time the other directors put through the resolution for a division of powers in 1933, either to go along and try to work things out peacefully or put up a fight.

He took the first course, he said, and did not even vote against the division of powers. Continuing to follow this policy, he added, he had to take many "bitter pills" for three years, but did not dissent from any board actions during that period.

Under the division of powers, he went on, Mr. Lilienthal individually committed the board in the power field, and Harcourt Morgan individually in the fertilizer and farm field, on major policies which should have been decided by the board as a whole.

He also charged that it was stretching its powers under its mandate to improve navigation to a ridiculous extent by such projects as the refrigerator barge to freeze strawberries and transport them down the river.

Curtis Testifies on Purchases

Dr. Harry A. Curtis on Aug. 2 accepted responsibility for the deal that netted International Agricultural Corp. a profit of $530,000 on the sale of a large phosphate rock deposit in middle Tennessee to TVA.

Dr. Curtis stated that the purchase price, $675,000, was his offer after the company had asked $750,000 for about 570 acres of land it had acquired for $148,000 between 1934, a year after TVA was created, and 1936, when he began negotiating the transaction.

He also reported that the purchase price amounted to about 11c a ton on the estimated 6,480,000 tons of phosphate rock, included in the deposit, compared with 3c a ton TVA had paid for the next largest deposit it has bought, and 7c as the top price it has paid for any other deposit.

Dr. Curtis defended the purchase by the high quality of the deposit, the indicated efficiency of mining operations, and the transportation advantages with respect to getting the material to Muscle Shoals.

Questioning by the committee's chief counsel, Francis Biddle, and other members of the committee disclosed that TVA has not yet attempted to work the former IAC deposit, but the chief chemical engineer insisted that TVA will effect sufficient economies in the mining operations and transportation to more than offset the higher cost of the land. Mr. Biddle brought out that Dr. Curtis had been willing to accept the survey of the IAC, the latter defending his action by the statement that "it is impossible to fake a thing like that." It was later shown that Harcourt Morgan had insisted upon a TVA survey and that a slightly larger deposit was found than that claimed by the company. Dr. Curtis stated that the reason the authority does not use the nitrate plants at Muscle Shoals to produce nitrates instead of phosphate fertilizers, is that one of the plants is obsolete and that the other could not be operated economically for nitrate production.

He said Nitrate Plant 1 was a "total loss," and should be junked. About one-third of Nitrate Plant 2 is being used to experiment in the production of cheaper and improved fertilizers, he added, and that the rest is kept in stand-by condition for national defense purposes in case of war, in accordance with the terms of the TVA Act.

Starts Resin Production

The new vinyl acetate resin plant of Shawinigan Resins Corp. has been completed at Indian Orchard, Mass., and production on a regular schedule will get under way immediately. Shawinigan is jointly owned by Monsanto Chemical, St. Louis, and Shawinigan Chemicals, Ltd., Montreal.

New plant, first of its kind in the U. S., has been under construction since middle of last year. It is on the bank of the Chicopee River in Indian Orchard, a suburb of Springfield, and is adjacent to the Plastics Division plant of Monsanto.

Vinyl acetate sheets for use by glass and motor car manufacturers in a new type of safety glass for automobiles, railroad cars and other vehicles will be the principal product of the plant. The new Monsanto vinyl acetate binder for glass is expected to replace rapidly the present cellulose acetate binder and to improve the glass to such an extent that safety will be greatly increased.

While the glass industry will be the chief user of the new product, many other uses are in the process of development in Monsanto research laboratories in Indian Orchard and Dayton, Ohio, and at the research laboratories of Shawinigan Chemicals at Shawinigan Falls, Que.

Production capacity of the plant has been established in anticipation of such developments and also in anticipation of general use of the new type glass throughout the automotive, rail equipment and aircraft industries here and abroad.

Resigns from Haynes Labs.

Ernest F. Bessette, former president of C. W. Haynes Laboratories, Inc., Springfield, Mass., announces that he has sold his interest and resigned as president. Mr. Bessette retains his connection as president of the Haynes Products Co., Inc., also of Springfield, which is a separate corporation not related to the finishing or lacquer field.

F. T. C. Reviews Dumping Practices

Lengthy Report Reviews Legislation in U. S. and Abroad Designed to Prevent Dumping of Foreign Goods—

The Federal Trade Commission has transmitted to Congress an up-to-date report on legislation in the U. S. and foreign countries relating to the practice known as dumping or the selling of goods more cheaply in a foreign market than at home. Report, entitled Antidumping Legislation in the U. S. and Foreign Countries, is supplemental to a report of the same title printed in 1934 as Senate Document No. 112, 73d Congress, 2d Session. At present only a summary of the supplemental report is available for distribution. Antidumping legislation reviewed embraces measures adopted by the U. S. and 39 foreign countries including Great Britain and several of her domains.

The following Summary of Measures During the Past Four Years is taken from the supplemental report:

A number of measures have been adopted in this country and abroad during the past 4 years, in addition to those adopted before and still in effect, in prevention of dumping or other restrictive or unfair practices used in import trade.

In the U. S., duties have been imposed to offset bounties abroad, and in some cases goods were excluded on the ground of unfair methods of competition or unfair acts in importation. Some duties have continued in effect to prevent imports at prices below the fair value or the cost of production. The Federal Trade Commission Act was amended in 1938 to prohibit not only unfair methods of competition, but "unfair or deceptive acts or practices" in interstate and foreign commerce. A number of inquiries were made under the National Industrial Recovery Act prior to its invalidation in 1935. The Agricultural Adjustment Act was amended in 1935 and again by the Soil Conservation and Domestic Allotment Act of 1936, authorizing limitation of importation if goods are coming in under such conditions and in sufficient quantities as to render ineffective or materially interfere with the program or operation of those acts. The Trade Agreement Act of 1934, passed as an amendment to the Tariff Act of 1930, authorized trade agreements with foreign governments or instrumentalities whenever existing duties or other import restrictions of the United States or any foreign country are unduly burdening or restricting the foreign trade of this country.

In the British colonies, especially in South Africa, numerous orders have been issued to prevent ordinary, bounty and exchange dumping. The South African law was amended in 1936, and the Australian law in 1933 and 1936. Some amendments were made in the Canadian law including exchange dumping provisions adopted in 1935. An antidumping law passed in Newfoundland in 1935 was repealed in 1936. A law passed in Southern Rhodesia in 1935 followed the lines of others in the British colonies; the same terms appear in the Customs Act of 1937. An exchange dumping law was passed in Egypt in 1935 and applied to goods from Japan and China. The Safeguarding of Industries Act passed in India in 1933 was followed by a bounty dumping law in 1934. In England a bill was introduced in 1934, but not passed, under which goods affected by currency inflation might have been excluded. The British Key Industries Duty Act of 1921 was again extended for a ten-year period beginning in August 1936.

In France the exchange dumping measures adopted in 1931 were continued, and a number of orders have been issued affecting goods from more than 20 countries in Europe, South and Central America, and the Far East. A French decree in December 1933 provided that exchange compensation surtaxes may be withdrawn on goods from any country the currency of which has remained stable for a period of at least one year.

The Italian Government adopted a plan, through a Royal decree in 1933, for increase of duties by a "coefficient of compensation" proportionate to depreciation of currency in the country of export. Other countries that have more recently passed measures in prevention of exchange dumping include Cuba, Denmark, Egypt, Estonia, Iraq, Paraguay, Poland and Rumania. In addition to those already noted, measures in prevention of bounty dumping were passed in Bulgaria, Cuba, France, Japan, Poland and Spain.

Several Latin American countries, including Bolivia, Ecuador, and Paraguay, have laws intended to protect national industries from trusts, cartels, or "arbitrary combinations" in foreign countries, and from prejudicial transportation facilities offered by combination agreements. A Spanish decree in 1934 included such a provision as to goods produced by combines or international cartels. In Brazil a decree in 1934 authorized a reduction of duties on imports if similar goods produced or marketed by Brazilian trusts or cartels are sold at high prices. A law passed in Bulgaria in 1936 would permit a lowered duty if goods are sold at unduly high prices on the local market when this is established by a price control agency.

In some laws, provision has been made to prevent the importation of goods produced by forced labor, prison labor, or by workers at low wage levels or under unfavorable working conditions (Cuba in 1935, Spain in 1934). The Spanish law provides for duties also in case of sale at prices "below the normal low prices due to the fact that in the production of the goods the international regulations in respect of social matters and especially as regards wages and working conditions have not been observed."

Stoney-Mueller, Inc., Formed

William Mueller and R. W. Stoney, well known in the chemical industry, both having had many years' experience in the solvent field, have organized the firm of Stoney-Mueller, Inc., at Page and Newark aves., Lyndhurst, N. J.

Mr. Mueller had been associated with Commercial Solvents for 17 years, and at the time of leaving that organization was general sales manager.

Mr. Stoney had been assistant general sales manager of Commercial Solvents. He had been with the company for 15 years.

Mr. Mueller will be president of the new firm and Mr. Stoney secretary and treasurer. They will act as manufacturers' agents in the sale of raw materials, principally for the paint, varnish, lacquer and chemical industries. The firm will have both bulk and package warehouse facilities.

Green, Golf Winner

Frank Green, National Aniline & Chemical, won the low net prize for members at the second golf tournament of the Salesmen's Association of the American Chemical Industry, held at the Garden City Country Club, Garden City, L. I. Approximately 75 participated.

Other prize winners included Vic Williams, Monsanto; Henry Hermann, General Dyestuff; George Bode, R. & H. Chemicals Division of du Pont; Ralph E. Dorland, Dow Chemical, and Ed. Scheullein.

The gathering stood in silence for a minute out of respect to the late Harry Wilmot, who was president of the Wilmot & Cassidy Co., Brooklyn.

The third tournament will be held August 16 at the Green Meadows Country Club, Harrison, N. Y.

Drum Plant at Port Arthur

Announcement has just been made of the establishment of a new steel drum manufacturing plant at Port Arthur, Texas, by Wilson & Bennett Mfg. Co. New modern plant, located at Washington & West 11th st., is expected to be in full operation soon and will be equipped with complete up-to-date production lines for manufacturing all standard sizes of steel drums and barrels. This will provide a complete and dependable Steel Container Service to the many refiners and manufacturers throughout the Southwest.

Plans for Fall Meeting

A committee of drug and chemical executives was formed last month for the purpose of making preparations for the third annual fall meeting and golf tournament to be held at Skytop Lodge, Skytop, Pa., Oct. 21 and 22. The meeting will be sponsored by the Drug, Chemical and Allied Trades Section of the New York Board of Trade, Inc., of which Philip M. Dinkins, vice president of American Cyanamid & Chemical, is chairman.

Organization committee consists of Ralph E. Dorland, N. Y. manager of Dow Chemical; William D. Barry, Mallinckrodt Chemical; Charles E. Kelly of Hagerty Bros. & Co. and president of the Salesmen's Association of the American Chemical Industry; R. B. Magnus of Magnus, Mabee & Reynard, Inc.; Turner F. Currens of the Norwich Pharmacal Co., and Hugh Craig, *Oil, Paint & Drug Reporter*.

Committee plans to make this fall get-together as attractive as those in years past. New features this year will be a cocktail party planned for Thursday evening, Oct. 20, and a beefsteak roast on Saturday evening, Oct 22.

As accommodations at Skytop Lodge are limited to 300, reservations will be made in the order in which they are received at the office of Ray Schlotterer, secretary, 41 Park Row.

F.T.C. July Reports

The Lumino Co., Inc., 515 Madison ave., N. Y. City, manufacturer of a material advertised as Lumino for use in structural waterproofing and dampness prevention, has been served by the Federal Trade Commission with an order directing it to cease and desist from certain misleading representations in the sale of its product.

The order directs that the company discontinue representing that its product is a waterproofing or a dampness preventive material or compound or that it renders walls or structures made of concrete, brick, cement or stone, impervious to water or dampness, and that the water repellent and dampness resisting qualities of Lumino are permanent.

Findings based on testimony and on tests made by the U. S. Bureau of Standards are that out of a large number analyzed there is no material or compound which is a permanent or absolute waterproofing or a dampness preventive material, and that the unqualified designation of these materials or compounds as such is a misnomer. Such compounds or materials are water repellents and dampness resistants of varying degrees of efficacy and durability, and are so needed and have value, according to findings.

This case is the first brought by the Commission involving misnomers of the type of products sold by the respondent company.

The Borden Company, 350 Madison ave., N. Y. City, has entered into a stipulation with the Commission under which it agrees to cease certain false and misleading representations in the sale of Casco, a glue product, according to another press release of the F. T. C.

Under its stipulation, the respondent will desist from the use on its labels or in advertising matter of the word "waterproof" as descriptive of its Casco Grade A Glue when in fact, according to the stipulation, such product is not impervious to water so as to be properly referred to as waterproof.

The stipulation relates that the respondent company's wholly owned subsidiary, The Casein Co. of America, Inc., labeled and advertised "Casco Grade A" glue as "waterproof" and that following dissolution of the subsidiary in December, 1937, the parent company continued to sell the product, but that fewer references to its alleged waterproofing quality appeared in The Borden Company's advertising.

"On the Gangplank"

J. W. Snyder of Binney & Smith Co., research & development dept., left New York in the *Brittanic* on May 14 and arrived in London on May 21. The first week was spent at the Rubber Technology Conference where a joint paper of W. B. Wiegand of Columbian Carbon Co. and J. W. Snyder was read. Two weeks following the conference were spent in making calls to the paint and ink industries throughout England. Short visits were also made to Scotland and Ireland.

Upon leaving England Mr. Snyder spent a short time in Belgium, Holland and in Scandinavia. Business calls were made in Copenhagen and Stockholm. Following a two-day visit in Germany, a detour through Switzerland brought Mr. Snyder to Paris. After a week in Paris he sailed from Cherbourg aboard the *Bremen* and arrived in N. Y. City on June 30.

William S. Gray, president, William S. Gray & Co., N. Y. City, sailed July 8 in the *Laconia* for a trip to England and returned Aug. 1.

Fletcher W. Rockwell, president, National Lead, sailed in the *Normandie*, June 29, for a 6 weeks' tour of Europe.

Calco's Vacation Dates

Calco Chemical's two-weeks vacation period started Aug. 6. Plant will resume operations Aug. 22. Hourly workers who have had at least 5 years of continuous service will receive two weeks pay in full. A skeleton force is maintained and shipments will be made promptly.

Obituaries

Dr. G. M. Johnstone Mackay, 55, director of consumer research at the Stamford, Conn., laboratories of American Cyanamid, died July 29 at his Summer home at Speculator, N. Y., of complications following an attack of pneumonia.

Dr. Mackay was born in Pictou, N. S., the son of the late Dr. and Mrs. A. H. Mackay. His father was for many years superintendent of education of Nova Scotia.

Graduated from Dalhousie University in 1905, Dr. Mackay also attended the M. I. T., where he attained high scholastic honors. His alma mater conferred the honorary degree of LL.D. on him in 1936.

He had been with American Cyanamid since 1933. Formerly he had charge of insulation research at the General Electric laboratory in Schenectady, where he was associated with Dr. Irving Langmuir in the development of the incandescent lamp.

A member of the committee on insulation of the National Research Council, Dr. Mackay also was Taft chairman of the Western Connecticut section of the A. C. S., and belonged to the Nova Scotia Institute of Science, the American Institute of Chemists and the American Physical Society. During the World War he was active in work on submarine detection methods at Newport, R. I.

Surviving are his widow, two sons, Johnstone S. and David Mackay, and a sister, Mrs. Lois Fraser, wife of Dean Everett Fraser of the University of Minnesota Law School.

Frank M. Bauer

Frank M. Bauer, 62, president of Pfaltz & Bauer, Inc., N. Y. City, died at his residence 419 Beach 122nd st., Rockaway Park, Long Island, on July 20.

Mr. Bauer entered business in 1900 with Henry Pfaltz, forming the firm of Pfaltz & Bauer, Inc., importers of chemicals, scientific instruments and laboratory apparatus. Steadily growing, the firm became an important factor in supplying equipment to American universities and industrial concerns. Mr. Bauer was also president and director of Cainy Realty Corp. and the Coast Realty Corp.

Active in civic and industrial affairs Mr. Bauer was a member of the Masonic Club of N. Y., the Square Club, Shriners, Queensboro Lodge B. P. O. E., Columbia Yacht Club, N. Y. Board of Trade, Drug & Chemical Club, Empire State Club and the Rockaway Civic Club.

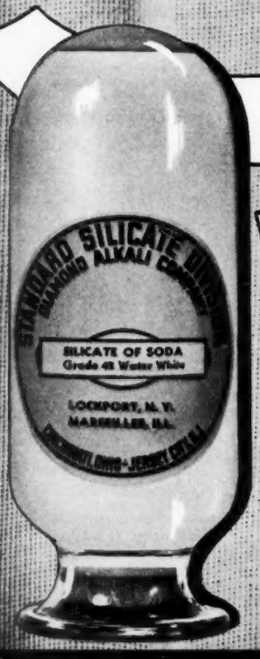
Mr. Bauer is survived by his wife, Edna Warner Bauer.

Hector D. Lane, southern sales manager, Federal Chemical, died July 8 at his home at Courtland, Ala., after a long illness.

Take that veil.. from your whites

Whether it's cotton, silk, rayon or wool, Standard Water White Silicate gives a stable peroxide bleach-bath that insures gleaming whites. Its high purity prevents stains and dullness. Standardize on Standard Water White for consistent results.

Standard Water White SILICATE



IT'S CRYSTAL CLEAR

T-4-38

STANDARD SILICATE DIVISION
Diamond Alkali Company
KOPPERS BUILDING • PITTSBURGH, PA.
Plants at CINCINNATI · JERSEY CITY · LOCKPORT, N. Y. · MARSEILLES, ILL.

National Oil Products Acquires Vitab

Purchase Expands Manufacturing and Service Facilities in Vitamin Field—American Cube Syndicate Issues Licenses—Other News of the Specialties Field—

News of the Specialties

Expansion of the manufacturing and service facilities of the vitamin divisions of National Oil Products by the purchase of the plants of the Vitab Companies, California corporations, has been announced by Perc S. Brown, vice-president of the Harrison, N. J., company.

With the acquisition of the Vitab Companies, National Oil Products extends its vitamin operations into all phases of the food, dairy, baking, pharmaceutical, drug, and animal husbandry industries. Nopco is the pioneer in the Vitamin D milk field with the manufacture of Vitex concentrate from cod liver oil for use in Vitamin D fluid milk, also the pioneer in the agricultural field with the manufacture of Nopco XX—a standardized, fortified cod liver oil for controlled vitamin feeding of poultry and farm animals.

An exchange of National Oil Products Co. stock was made for all the assets of the California companies. The former Vitab Companies are being dissolved. Named "The Vitab Corporation," the new corporation is capitalized at $500,000 and becomes a wholly owned subsidiary of National Oil Products. Plants are at Emeryville and San Francisco, Calif.

Officers of The Vitab Corporation are: Charles P. Gulick, president; Perc S. Brown, vice-president; Ralph Wechsler, treasurer; and A. A. Vetter, secretary. Officers of The Vitab Companies were: E. H. Heller and A. K. Humphries of San Francisco and Charles L. Bowman of N. Y. City.

Mr. Brown states The Vitab Corporation will operate the plants at their present locations and will become a manufacturing unit only with Nopco as the sales unit for Vitab products. Charles L. Bowman of the former Vitab group becomes sales manager for an enlarged Pharmaceutical Division of Nopco, with headquarters at Harrison, N. J., to handle all sales of Vitab B & G products to the pharmaceutical industry. When plans have been completed, Mr. Bowman also will direct sales of all vitamins to this industry.

S. S. Carlat of Nopco's special markets division, Harrison, N. J., becomes sales manager of that division, handling sales of all vitamin products for human use in fields other than pharmaceutical.

C. I. Post becomes manager of both of the Nopco sales divisions mentioned above, in addition to Nopco's Vitex Division, all at Harrison, N. J.

In the Emeryville-California plant, a complete line of concentrates of the Vitamin B Complex from a rice bran source will be produced. These products are designed for use by the food, pharmaceutical, and allied industries. It is anticipated that products for use in the agricultural field will be developed, at which time their sale will be handled by Nopco's agricultural sales divisions at Harrison, N. J. The California plants will manufacture both a Vitamin B and wheat germ combination product for the bakery field and Vitamin G products from a milk source.

In making the announcement, Mr. Brown pointed out that production in the Vitab plants will not be interrupted by the change in ownership. The Biological and Research Laboratory of The Vitab Corporation remain in Berkeley; also the chemical laboratory at the Emeryville plant. R. W. Davis of Berkeley, production superintendent of the Emeryville and San Francisco plants, will retain his post.

Opens California Branch

The Detroit Rex Products Co., Detroit, manufacturers of Detrex degreasers, Perm-A-Clor and Triad solvents, and Triad alkali cleaners and strippers, has recently opened a new branch office at 111 Sutter Bldg., San Francisco, in charge of W. A. Vensel, West Coast manager. Ample warehouse stocks of solvents are carried for immediate delivery to all points in this territory.

Benefits of Advertising

National advertising in small space for 30 years has put Le Page glue in first place among 40 jobbers, according to a report prepared by *Hardware Age* for Van Sant, Dugdale & Co., Inc., of Baltimore. The Le Page concern spends about $30,000 a year in national magazines. In second place is Casco, second largest and most consistent advertiser. Nationally advertised in small space for six years, Casco spends about $20,000 a year in national magazines.

Used Clorox Bottles

Universal Specialties Co., Bronx, N. Y., recently pleaded guilty to the charge that Clorox bottles had been refilled. The individual, doing business as Universal Specialties, was fined for refilling Clorox bottles with another product and selling it under the name Clenzol.

Licensed on Cube

The American Cube Syndicate, Milwaukee, Wisc., has issued licenses for the use of cube as an insecticide, under provisions of the Dennis patent, to R. J. Prentiss & Co., N. Y. City; John Powell & Co., N. Y. City; the Hammond Paint and Chemical Company, Beacon, N. Y.; and to Derris, Inc., with the license of the latter company covering the use of the product by McCormick & Co., Baltimore, and Dodwell & Co., Ltd., N. Y. City.

Validity of the Dennis patent was upheld June 3, by Federal Judge Geiger, in a suit brought by the inventor, Walter J. Dennis, and the licensees, the American Cube Syndicate, and Frank S. Stamberg, doing business as the American Crop Protection Co., against the Agicide Laboratories, Milwaukee.

Dieck With Haas-Miller

Haas-Miller Corp., 4th and Bristol sts., Philadelphia, manufacturers of chemicals, oils and greases, announces appointment of Fred W. Dieck as sales representative to contact rayon and silk throwsters. Mr. Dieck was formerly associated with the Susquehanna Silk Mills at Sunbury, Pa., having served with that company for 25 years. Mr. Dieck will introduce and demonstrate several new products.

Others in New Positions

B. W. Bailey is now vice-president and a director of Colgate-Palmolive-Peet, Jersey City, N. J. Mr. Bailey is in charge of the company's soap business west of the Mississippi river. His offices will be in Kansas City and Berkeley, Calif.

Mr. Bailey was at one time vice-president of the Peet Brothers Soap Co., now part of the present concern, and later president of Kirkman Soap, Brooklyn, N. Y.

John R. Van Dyne has been named general sales manager of the American Disinfecting Co., well-known producer of dry-cleaning soaps, located at Sedalia, Mo.

H. V. Walker Co. of Elizabeth, N. J., appoints William J. DeVoti, of Newark, N. J., as sales representative covering the metropolitan area. Mr. De Voti is well known in the plating industry.

Zirlin Sails

S. C. Zirlin, sales manager, Marine Laboratories, Inc., Brooklyn, N. Y., is on an extended business trip. He will visit company's agencies in the South, on the Pacific coast, and in the Orient. He expects to be away 5 months.

P. & G. Co. has renewed for a year its network radio programs for Oxydol and Dreft.

Heavy Chemicals

Demand for Industrial Chemicals Improves

Buyers Are Entering the Markets in Larger Numbers for Replacements—Chemicals Moving into the Textile and Leather Fields in Better Volume—Copper Salts Advanced Sharply—Sodium Silicofluoride Weak—Poor Demand for Plating Chemicals—

Important Price Changes

	July 31	June 30
ADVANCED		
Copper carbonate, 52-54%	$0.14	$0.132
Copper	.10⅛	.09½
Copper sulfate	4.25	4.00
Copper sulfate (mono)	8.45	8.30
oxide black	.14¾	.14¼
Sodium stannate	.29½	.28½
Tin crystals	.35	.34½
Tin metal	.44¼	.43
Tin oxide	.48	.46
Tin tetrachloride	.22½	.21¾
DECLINED		
Ammonium silicofluoride	.09	.09½
Antimony, metal	.10¾	.11¼
Selenium, powd.	2.00	2.20
Sodium pyrophosphate	5.90	8.00
Sodium silicofluoride, imp.	.04½	.05
Sodium silicofluoride, dom.	.05¼	.05¾

Rice to South America

Hugh M. Rice, manager of the chemical products division of the Phelps Dodge Refining Corp., N. Y. City, left Aug. 1 for a business trip to Venezuela, Columbia, and Central America. The newly formed chemical products division of Phelps Dodge was formerly the well-known Nichols Copper Co., large producer of copper sulfate.

Petitions Bankruptcy

The Industrial Chemical Co., Inc., 300 Plaza Rd., South Fair Lawn, N. J., has filed a voluntary petition in bankruptcy.

Completes Glycerine Plant

Reichhold Chemicals, Inc., Detroit, formerly Beck, Koller, has completed a $75,000 glycerine plant. Other units for the making of additional chemicals in the industrial chemicals classification are now in progress.

The equipment to be installed will provide for the application of such processes as catalytic oxidation in the vapor phase, catalytic hydrogenation and dehydrogenation, hydroxylization, pressure hydrolysis, fermentation, and others which are employed in the making of chemicals from such basic substances as coal tar, natural gases, mineral oils and farm products. As soon as other units are completed and in production, announcement will be made of the products available to the trade.

With Bona Allen

John A. Wilson, president, John Arthur Wilson, Inc., consultants on leather, has accepted the position of technical director of Bona Allen, Inc., Buford, Ga. The firm of John Arthur Wilson, Inc., will be liquidated, and all of the laboratory equipment moved to Buford. When Dr. Wilson severed his connections with A. F. Gallun & Sons Corp. in 1929, Bona Allen, Inc., became his first client.

The moderate improvement in demand for industrial chemicals, which started in June, carried through July contrary to the normal seasonal trend. Replacement orders came in with greater frequency. Buyers, however, are still moving cautiously. Spot purchases are generally for relatively small quantities and shipments against existing contracts are still somewhat behind. The best demand came from the textile and leather fields, while the plating and coatings industries were still extremely dull, affecting shipments of such representative items as cyanides, chromic acid, nickel salts, etc.

Heavy rains during part of the month slowed down the call for calcium chloride momentarily, but a better volume was noted in the final week of the month. Products, such as ammonia, alum, chlorine, etc., which are particularly in demand in hot weather, moved out in very satisfactory quantities. The alkalies were in fair demand and the same thing is true of bichromates. A firm tone was apparent in copperas, and stocks were none too large.

Price changes were almost wholly restricted to changes caused by revisions in the metals. Copper was advanced to 10⅛c and this brought about higher prices for the carbonate, the oxides, and copper sulfate. The latter is still hard to obtain with the export market very active. Tin continued its earlier rise and closed the month at 44¼c with all of the derivatives at higher levels. Antimony was the one exception in the metals and sank lower when demand dropped still further.

Two other price changes of importance were reported last month. Red prussiate of potash dropped sharply lower, the 1½c decline being attributed to greater competition and the accumulation of stocks from abroad. The other was a 1c advance on anhydrous aluminum chloride. No changes were made in the crystals or in the solution.

Competition between domestic and imported sodium silicofluoride became more active and prices suffered as a result. Ammonium silicofluoride declined ½c, to a basis of 9c in large quantities. A sharp decline was also noted in sodium pyrophosphate. Production of this comparatively new addition to the phosphate family has made it possible to lower quotations.

The mineral acids were not specially active in the past 30 days. Only moderate tonnages of sulfuric moved into consuming channels. A fair inquiry was reported for acetic, formic, gallic, and lactic.

News from the principal processing fields was encouraging, particularly in the textile and leather industries. Slightly disappointing were the July takings of raw silk, 32,593 bales. Although this was over 1,000 more than in June the trade had expected between 33,000 and 34,000. June crude rubber consumption amounted to 30,629 long tons, compared with 28,947 in May and 51,860 in June a year ago. Rayon shipments were heavier in July, some firms reporting increases of 25% over June. The glass industry is showing definite signs of betterment. June plate glass output totaled 5,956,386 sq. ft., as against only 3,866,052 in June. Window glass production was only 21.3% of capacity, however, as against 88% capacity in June of last year. Boot and shoe production in the first 6 months was off 21.5% from the same period last year, but current operations are heavy and manufacturers have enough business to keep them busy through the fall months at least. May hose shipments rose 3.5% in May, the first increase for any month this year.

Action on Sulfur Tax

Reduction in the present severance tax of $2 per ton on sulfur to the lower figure of $1.03 collected in Texas is provided for in a measure (Act 395, H. B. 654) approved by the Louisiana Legislature and signed by Gov. Richard W. Leche on July 10.

The act, a proposed constitutional amendment which will be voted on by the electorate in the November general election, also provides for assessment of unmined sulfur for ad valorum taxes not to exceed twice the value of property above ground.

New Paterson Supplier

The Beattie Color & Chemical Co. has been formed at Paterson, N. J., to deal in dyes and industrial chemicals. Office is at 144 Market st. and William C. Beattie is in charge.

The Central West Chemical Co. has moved its headquarters from Burlington, Iowa, to Omaha, Neb. Company has maintained warehouse stocks at Omaha for the past year.

Arthur E. Wilks, formerly purchasing agent for B. B. & R. Knight is now with Sessions Gifford Co., Providence chemical distributors.

Coal-tar Chemicals

Intermediates and Acid Colors in Better Demand

Coal-Tar Solvents Dull—Cresylic Steady at Levels Reached in June—Shortage of Benzol Reported in Certain Sections—Imported Crude Naphthalene Reduced 10c—June Coking Operations Show Continuance of the Prolonged Decline—Fall Outlook Promising—

The market for coal-tar chemicals in July was featured by an improved demand for intermediates and coal-tar colors, reflecting the preparation of the dye makers for a more active season. With the revival of the textile and leather fields, shipments of dyes have increased quite noticeably and still greater improvement is anticipated shortly with the fall season now but a few weeks off.

The more active state of the intermediates did not find a counterpart in the other basic coal tars. The solvents, solvent naphtha, xylol, and toluol, were still in the doldrums, reflecting the currently low operating conditions in the coatings industry. This situation is not expected to last for long, however, for the automotive makers now fear a car shortage in September and, as a result, are pushing their plans for '39 models. The rubber industry, too, is expanding operations. Most encouraging is the decrease in the stocks of tires. A fairly active season is now expected in the Akron area.

Benzol is in excellent demand considering the restricted amount of material that is available because of the sharp drop in coking. Some producers are being hard put to make prompt deliveries in certain sections. Prices of both benzol and the coal-tar solvents were without changes in the past 30 days.

A slight pick-up in the demand for phenol from the dye makers was reported, but the plastics and synthetic resin manufacturers are still holding production down awaiting developments. Cresol was in fair demand. The market for creosote oil was routine and still highly disappointing. Cresylic acid was quiet and no further reductions were made in either domestic or imported. Seasonal influences were responsible for the light trading in crude naphthalene. The imported crude was somewhat weaker, a decline of 10c bringing the current market down to $1.60. No change was made in domestic material. Stocks of crude abroad are plentiful and competition is keen.

June Light Oil Output

June recovery of light oil totaled 8,528,529 gals., as compared with 9,416,186 during May and 16,842,864 gals. in June of '37. The total for the 6 months period was 60,760,442 gals., as compared with 107,442,513 in the corresponding period of last year.

June tar production amounted to 25,966,586 gals., compared with 28,658,214 in May and 51,281,024 in June of '37. The total for the first 6 months was 184,995,710 gals., against 327,127,378 gals. in the same period a year ago.

With steel operations expanding at an encouraging rate now, more coking will be done. This will supply more crude materials, so that there is little possibility of an acute shortage of coal-tar chemicals this fall when consumption is expected to expand rapidly.

June Coke Output Down

Output of byproduct coke in June totaled 2,066,530 tons, a decrease of 6.4% in comparison with the May rate. Benzol output totaled 4,413,000 gals., as compared with 4,905,000 in May, a decline of 10%, and with 9,517,000 gals. in June of '37. Output for the first half of the year reached only 32,431,000 gals., as compared with 60,921,000 in the first 6 months of '37.

Calco Engages Three

Calco Chemical, Bound Brook, N. J., announces that John H. Grady, formerly manager of the Boston office of John Campbell and Co., has become associated with its Boston office. George Lommel, formerly vice-president of John Campbell and Co., N. Y. City, is now associated with the main office in Bound Brook. Robert P. Wood, formerly in the finishing business, is now connected with the Calco office in Providence.

Sells John Campbell

American Cyanamid announces that it has disposed of its interest in John Campbell & Company, Inc., to a group of Campbell employees who will continue to supply the consuming trade as heretofore. Main office will be continued at the same address as before, 75 Hudson st., N. Y. City, with branches in Philadelphia and Boston.

Important Price Changes

ADVANCED

	July 31	June 30
None.		

DECLINED

Naphthalene, crude, imp	$1.60	$1.70

Protests Labor Election

A protest against the election, which the American Federation of Labor lost on July 7, at Calco Chemical, Bound Brook, N. J., by 39 votes, has been filed by Thaddeus J. Burns, organizer for this district of the A. F. of L.

A total of 676 votes were cast against the A. F. of L. as sole collective bargaining agent for employees of Calco and the Beetleware Products Division of American Cyanamid and 637 in favor of it.

The A. F. of L. was the only type of unionization mentioned on the ballot, because Calcocraft, an independent organization, was disbanded by the decision of the NLRB that it was a company union, and the Committee for Industrial Organization had insufficient representation in the companies.

Crawford With Nat. Aniline

Raymond B. Crawford, who has been holding a teaching fellowship in organic chemistry at N. Y. U., accepts position as research chemist with National Aniline, Buffalo.

Puller With Carbic

Carl A. Puller, well-known dyestuff salesman, has recently joined the sales staff of Carbic Color & Chemical. Mr. Puller brings to the Carbic organization a broad experience as well as a personal sales contact gained by years of selling to dyestuff consumers, particularly those located in northern New Jersey.

Comparison of U. S. Production of Dyes (by Classes of Application, 1925-30, 1936 and 1937).

Class of application	Production, Quantity			Per cent. of total		
	1925-30 average	1936	1937	1925-30 average	1936	1937
	Pounds	*Pounds*	*Pounds*			
Acid	11,813,941	15,974,423	15,319,063	12.57	13.38	12.53
Azoic	[1]	[1]	[2] 2,699,643	....	....	2.21
Basic	4,833,382	5,727,303	5,775,239	5.14	4.79	4.73
Direct	17,983,751	[3]29,907,629	30,619,424	19.13	25.02	25.05
Acetate silk	[4]	2,389,885	2,191,881	....	2.00	1.79
Lake and spirit-soluble	1,947,124	2,722,807	3,157,406	2.07	2.28	2.58
Mordant and chrome	3,611,608	6,639,112	6,192,888	3.84	5.55	5.07
Sulfur	20,004,635	20,717,289	20,528,542	21.28	17.33	16.79
Vat, total	33,221,072	34,449,513	34,501,413	....	....	....
(a) Indigo	27,128,311	18,039,419	24,842,627	28.86	15.09	20.32
(b) Other	6,092,761	16,410,094	9,658,786	6.48	13.73	7.90
Unclassified	587,657	995,185	1,259,080	.63	.83	1.03
Total	94,003,170	119,523,146	122,244,579	100.00	100.00	100.00

MANUFACTURING CHEMISTS SINCE **1849**

YEARS of experience, continuous research, large capacity and ability to meet special and exacting requirements, gives us leadership in the World production of Citric Acid.

The physical uniformity and the high purity of our product are unexcelled by any other maker.

CHAS. PFIZER & CO., INC.

NEW YORK
81 MAIDEN LANE

CHICAGO
444 W. GRAND AVE.

Iodine, Iodides Sharply Higher

Mercury Turns Downward—Quoted at $76.50 per Flask—Menthol Raised to $3.25—Competition Drives Vanillin Lower—Good Seasonal Demand for Citric and Tartaric Acids —Agar Advanced 10c—

Fine Chemicals

The outstanding feature of the fine chemicals markets in July was the sharp advance in crude iodine, in fact two advances were registered during the month. With crude iodine at $1.07 in kegs, producers of the various iodines were compelled to completely revamp their price schedules. Iodoform and resublimed iodine were other items priced higher. In connection with the crude iodine price a 5% discount was announced for quantities of 2,000 lbs. or over in one delivery.

Quicksilver turned decidedly weak in the last 30 days after the somewhat feverish speculation of the past few months. Material changed hands at $76.50 per flask. No change was reported in the price structure of the mercurials.

New Magnesia Price Bases

A new pricing policy for calcined magnesia was announced last month. Quotations on both technical and U. S. P. are identical, namely 26c. The new price is f.o.b. works and applies to any quantity. The new figure represents a gain of 3c over the lowest price previously in force.

Menthol Stronger

Menthol was advanced in July to a basis of $3.25. The increase locally was caused by higher replacement quotations from Japan following the floods in Kobe. Demand was still light from consuming fields.

The decline in alcohol is reported on in detail in the Solvents and Plasticizers Section. Glycerine was somewhat more stable in the last few weeks. Little improvement in actual consumption was reported, but offerings, particularly foreign material, were not as heavy and therefore the market took on a firmer appearance.

No further price revisions were reported in the tartars, but the firmness which has characterized this market for months still continues without change. Bismuth metal and its salts are firm and unchanged in price. Agar turned upwards last month after a long period of weakness and 10c advances were put in effect for both No. 1 and No. 2. The most important price revision in the aromatics was a 5c reduction in cinnamic aldehyde.

Vanillin Highly Competitive

Competition in vanillin became even more acute. A decline of 10c was made in this item by the new producer and this was promptly met by those using eugenol and guaiacol as bases of manufacture.

The volume of business in fine chemicals and aromatics in July was fairly satisfactory and a decided improvement over the spring months was in evidence. The exceptionally warm weather aided in the movement of citric and tartaric acids.

Verona Plans Expansion

Plans for adding to its manufacturing line of aromatics, photographic chemicals and coal-tar intermediates are under consideration by Verona Chemical, Newark, N. J. Present management, with Franklin H. Stafford as president, assumed charge of Verona early in the year, having purchased from Edwin Kuttroff the principal assets and property, together with the name Verona Chemical. Mr. Stafford, a graduate of Princeton, has for the past 12 years been living abroad.

New Chicago Offices

Compagnie Parento, Inc., manufacturer of essential oils, and perfume materials, also of N. Y. City, moves its Chicago office to larger quarters at 537 S. Dearborn st. Office is under the management of Edward J. McBrady.

Magnus, Mabee & Reynard, Inc., essential oils and related materials, N. Y. City, moves its Chicago office to room 610, 180 North Wacker Drive.

Wiedman Now Secretary

H. A. Wiedman, sales manager for P. R. Dreyer, Inc., N. Y. City aromatic chemical house, is now secretary of the company.

A.I.Ch.E. Meets Nov. 9-11

The American Institute of Chemical Engineers has selected the Benjamin Franklin Hotel in Philadelphia as official headquarters for the annual meeting scheduled for Nov. 9-11.

Gen. Chemical Wins

In a two-to-one decision, the N. L. R. B. on July 15 dismissed an unfair labor practices complaint against General Chemical (Baltimore plant). Charges against the company, upon which the board's original complaint was based, were filed by District 50, United Mine Workers of America, Gas By-product Coke and Chemical Workers, Local 12031, an affiliate of the Committee for Industrial Organization.

Board found that the company had not interfered with the formation or administration of any labor organization or contributed financial or other support to it within the meaning of the act; nor had it discriminated in regard to the hire and tenure of employment of George Wicklein or Francis Walters because of their membership in a labor organization, as alleged in the complaint against the company.

Important Price Changes

	July 31	June 30
ADVANCED		
Acid hydriodic	$2.30	$2.20
Ammonium iodide	3.45	3.25
Calcium iodide	3.85	3.70
Iodine, crude, kegs	1.07	.95
Iodine, resublimed, jars	1.75	1.50
Iodoform	3.95	3.75
Menthol	3.25	3.00
Potassium iodide, bbls.	1.13	.93
Sodium iodide, jars	2.21	1.90
DECLINED		
Cinnamic aldehyde	$0.85	$0.90
Mercury	76.50	82.00
Podophyllin	4.65	5.00
Vanillin ex eugenol	2.25	2.35
ex guaiacol	2.15	2.25
ex lignin	2.15	2.25

Rubber and Plastics

That applications of rubber and plastics are rapidly forging ahead is clearly evident from the attention now being devoted to these materials. Indicative of the trend, the A. S. M. E. recently established a committee, or subdivision, on rubber and plastics which will deal with several phases of the rubber and plastics industries including mechanical applications, research on basic mechanical properties, processing equipment, and standards. Activities of the group will be beyond the normal range of other professional organizations in an effort to fill the present conspicuous gap in the mechanical field.

Bituminous Coal Costs

Millions of dollars of excessive costs for bituminous coal can be imposed on consumers if the National Bituminous Coal Commission does not insist on "reasonable cost" in selling coal, John Carson, Consumers' Counsel, warned July 26.

The Coal Commission is about to decide what is the weighted average cost of production of coal in various price areas. One of the factors of cost is that of selling coal. The Commission has had statements and reports from various producers and their representatives as to what their "actual cost" of selling is, but Carson contends the law demands the Commission shall determine what the reasonable cost of selling coal is and that to adopt a policy of approving "actual costs" might add millions of dollars to the bills of consumers.

J. Albert Woods, vice-president of Chilean Nitrate Sales, presided at a 3-day sales convention held at the Hotel Warren, Virginia Beach, Va., on July 13-15. Over 50 representatives from all over the U. S. were present.

Solvents and Plasticizers

Important Price Changes

ADVANCED

	July 31	June 30
None.		

DECLINED

Alcohol, amyl, ex pent., tks.	$0.106	$0.123
drs.	.116	.133
Alcohol ethyl	4.49½	4.51½
Alcohol, denatured, drs.	.33	.35
tanks	.25	.27
S. D. tanks	.27½	.29½
Special Solvent	.24	.26
Alcohol, butyl, drs.	.09½	.10
tanks	.08½	.09
Amyl acetate, ex pent. drs.	.11	.12½
tanks	.10	.11½
Butyl acetate, sec. drs.	.07½	.08
tanks	.06½	.07

New CSC Directors

Theodore P. Walker, president of Commercial Solvents, reports election of Samuel M. Greer and Linus C. Coggan to the board of directors of the corporation.

Mr. Greer was elected to fill the vacancy in the directorate caused by the death of William D. Ticknor, president of Commercial Solvents. Mr. Greer is director of American Steel Foundries and Servel, Inc., and, for many years he was an officer of the Bell Telephone System.

Mr. Coggan, who succeeds Philip L. Reed on the board of Commercial Solvents, is a director of the Kansas City Southern Railway and is also counsel for and director of Corn Products Refining, whose president, George M. Moffett, is also a member of the board of directors of Commercial Solvents.

Mr. Walker, who was elevated to the presidency of Commercial Solvents upon the death of Mr. Ticknor, has been with the corporation since 1922. He was elected a vice-president in 1924 and has been executive vice-president since 1928.

During the World War Mr. Walker was a major in the U. S. Air Service with the Third Army Corps in Germany. After the war he was eastern manager in the Orient for the American Metal Co.

Hutchins Promoted

Robert L. Hutchins has been appointed N. Y. district sales manager for Commercial Solvents. He succeeds Herbert Sliger, who has been named Eastern district sales manager.

Mr. Hutchins was formerly New England sales manager for Commercial Solvents, having assumed that position in 1933, after the merger with Rossville Alcohol, with which company he had held a similar position.

Lacquer Solvents Reduced Sharply

Light Consumption and Competitive Conditions Force Lower Prices for Alcohol, Butyl Alcohol, Amyl Alcohol, Butyl Acetate and Amyl Acetate—Anti-Freeze Prices Announced—One Mid-West Producer Raises Quotations for Petroleum Solvents—Fully Refined Paraffin Wax Reduced—

Most of the price activity in the past month centered in the solvents' group, with declines outnumbering the advances. Rather unexpected was the 2c decline in ethyl alcohol. The same decline was announced for completely denatured, specially denatured, and special solvent. Although consumption, due to generally poor conditions, has not been satisfactory, it was believed that production costs would hardly permit any further price reductions.

The new schedules on specially denatured and special solvent are for deliveries over the balance of the year. The new schedule on completely denatured for anti-freeze purposes covers deliveries up to March 31 of next year. The latter is offered at 33c in drums and 25c in tanks.

Several of the more important solvents were sharply reduced in the past 30 days, including butyl alcohol, butyl acetate, amyl alcohol, and amyl acetate. The demand for solvents from the coatings industries has been very unsatisfactory for a long time, due, of course, to the sharp curtailment of activity in the automotive centers. Competition, too, from the petroleum solvents has become more severe in that period, adding to the degree of unstability of the general price structure. June automotive production only reached 170,000 units, and July output is thought to have been well under 100,000 units. Little improvement is expected in August for a number of the larger producers will be closed at least part of the month for repairs and inventory. A sharp pick-up is expected, however, in September. Car manufacturers are pushing ahead their plans for '39, due to the improved state of feeling and because of the small stocks of finished cars on hand.

Higher Pet. Solvent Prices?

One producer of petroleum solvents in the mid-west advanced quotations ¼c in the third week of the month, but the remainder failed to follow suit, at least up to the end of July. The action of the one producer in the middle-west did not affect quotations at east coast refineries, nor were the tankwagon prices changed in either the mid-west or in the east. The same reasons for the restricted consumption of butyl alcohol, butyl acetate, etc., largely applied to the petroleum solvents employed industrially. A fair demand was reported both in the mid-west and on the east coast for cleaner's naphtha and Stoddard solvent.

A new reduction in prices was announced for fully refined paraffin waxes. A very competitive condition exists, and except for the 123-125 and 125-127 American melting points, all grades of fully refined wax are being offered in slabs loose or in bags without the usual differential on bags.

Trimethyl phosphate is now being offered in commercial quantities at the following prices: drums, l.c.l. 50c per lb.; 5-gal. cans, 54c; 1-gal. cans, 56c. The price on drums is f.o.b. destination. No freight allowance on the smaller containers is being made. Containers are included and are not returnable.

Alcohol Statistics for June

June ethyl alcohol production amounted to 16,395,184 gals., as compared with 18,657,582 in June; output of completely denatured totaled 2,492,965 gals., as against 878,226 in June of last year; especially denatured production was reported at 5,376,687 gals as compared with 7,441,693 in the corresponding period.

Production of ethyl alcohol in the period July 1, '37, to June 30, '38, totaled 201,033,857 proof gals., as against 223,181,228 in the previous fiscal year; in the 12 months' period output of completely denatured amounted to 25,599,317 wine gals., as against 22,118,378; while output of specially denatured was 69,009,735 gals., as against 80,084,281 in the earlier period.

Poor Showing in Plastics

Little if any improvement was discernible in the output of the plastics industry in May. For example, May production of nitrocellulose sheets totaled but 415,981 lbs., as against 1,237,034 in May of last year, while the volume in the first 5 months of the current year amounted to 2,227,959 lbs., as against 6,739,675 lbs. in the corresponding period of a year ago. Output of cellulose acetate (sheets, rods, and tubes) in the first 5 months of '38 amounted to 1,357,457 lbs., as compared with 6,324,997 in the like period of '37.

A comparatively better showing was made by the figures for pyroxylin-coated fabrics. Shipments of light goods totaled 2,558,834 linear yds., as compared with 2,596,269 in April, and 3,236,929 in May of '37. Shipments of light goods were 1,513,237 in May, '38, as compared with 1,640,483 in April, and 2,062,580 in May of last year. May output of pyroxylin spread totaled 4,149,846 lbs., as against 4,334,623 lbs. in April and 5,422,538 in May of '37.

Agricultural Chemicals

Cyanamid Prices Renewed for '38-'39 Season

Nitrate Suppliers Expected to Announce Quotations Late in August—Imported Calcium Nitrate up 25c—Sulfate Producers Report August Tonnage Sold—Natural Ammoniates Sharply Higher—Bone Materials Advanced—Mixers Still Uncertain Over Volume for New Season—

Trading in raw fertilizer materials was quite subdued in the past 30 days. Fertilizer mixers are still largely in the dark as to what the new season will bring in the way of developments. Until more factual information is at hand it is not likely that buying will assume heavier proportions.

The market was featured by further wide gains in the natural ammoniates. Dried blood and tankage were quoted much higher and the eastern suppliers of nitrogenous material were not offering. Suppliers of nitrate of soda announced early in the month that they would accept immediate tonnage at unchanged levels. Prices for the new season are expected to be announced late in August.

Fish meal at Baltimore was advanced $2 a ton; Japanese sardine meal for shipment was raised $1 a ton to $43; hoof meal at Chicago was "upped" 15 points, to a basis of $2.50. Imported castor pomace is now quoted at $21 a ton, an advance of $1 a ton. Suppliers of dibasic phosphate revised their prices 5c per unit to 81c.

A number of sulfate of ammonia producers reported that their output for August was completely sold up. As yet there has been no actual shortage of supplies. With steel production now definitely on the uptrend the trade is wondering whether the expected fall shortage will develop.

Prices on imported calcium nitrate were released last month for the '38-'39 fertilizer season. They are about 25c to 50c per ton higher than last year's schedule.

Another important announcement was released last month—sellers repeated last season's price of $1.15 per unit of ammonia for pulverized material, in bags, delivered. Contracts were offered on this basis through June, '39.

Considerable booking activity was reported in the potashes previous to the expiration of the 12% discount. Very little action is now looked for until late in September when the 5% discount allowance expires.

Bone materials joined the general upward revision in prices of raw fertilizer materials. Raw 4½ & 50 is now quoted at Chicago at $27-$28 per ton; 3 & 50 meal at $22-$24 a ton; and 1½ & 60 steamed material closed the month at $19-$20. Producers of superphosphate reported that a few contracts still remain open, but that the majority of buyers have signed at the higher levels announced in June.

Considerable interest was aroused in fertilizer circles when it was learned that two shipments of Spanish potash arrived in Savannah recently. It is a long period since Spanish potash has entered this country. A number of years ago when the Spanish material first made its appearance quite considerable competition developed, but later the Spanish source joined the International Potash Cartel.

Not a Bad Fertilizer Year

Based on tag sale statistics for 17 States, which account for 71% of the total tonnage, and estimates for the remaining states, The N. F. A. places fertilizer consumption in the U. S. in the year ended June 1938 at 7,371,000 tons. This is 801,000 tons below 1936-1937, but with that exception is by far the largest tonnage in any year since 1930. Amount of superphosphate produced by TVA and distributed by it and by AAA is not included in the above tonnage figure.

Consumption in the South declined somewhat more than in the rest of the country, with tag sales in the 12 Southern states 11% below 1936-1937. In view of the reduction in cotton acreage this decline was not especially severe and it was less than was generally anticipated at the beginning of the season. Georgia suffered the greatest loss with 1937-1938 consumption 17% below last year, with declines in Alabama, South Carolina, and Virginia next. Texas and Oklahoma were the only two states in the South to register increases.

Tonnage in the Mid-west held up fairly well, with tag sales in the 5 reporting states only 4% under the preceding fiscal year. A particularly good showing was made by Kansas and Kentucky. The largest decline in all 17 states was 24% in Missouri.

Total tag sales for the month of June in the 17 states amounting to 117,078 tons, were 1% larger than in June 1937 and 37% larger than in June 1936. Sales in the South in the first six months of this year amounted to 116,361 tons, an increase of 1% from the same period of 1937. January-June sales in the Midwest, however, were 30% below last year.

Superphosphate Production Up

Superphosphate production in May was somewhat larger than in April, in contrast to a seasonal decline which usually takes place between the two months. Increase over April was entirely in the Northern Area, with a slight decline reported by producers in the South. As compared with May of last year, there was a decline in output of 18%, according to reports by acidulators to The N. F. A. Production in each month this year has been below the corresponding month of '37. In the first 11 months of the current fiscal year, from July through May, production of reporting acidulators totaled 3,225,000 tons, a decline of 4% from the same period of last year. Production in the last half of '37 was relatively large.

There was a small rise in stocks of bulk superphosphate during May, following seasonal declines in the 3 preceding months. At the end of May, bulk stocks of the reporting firms were 40% larger than a year earlier. After adjustment for the usual seasonal variation, they were also at the highest point reached in recent years. The increase in the past year has been much larger in the Northern Area than in the Southern. The decline in stocks of superphosphate in base and mixed goods in May was larger than the usual decline during that month. Such stocks at the close of the month were somewhat smaller than a year ago and were at a comparatively low level.

Important Price Changes

ADVANCED

	July 31	June 30
Blood, dried, N. Y.	$3.10	$2.75
Chicago	3.10	2.75
Imported	3.35	3.20
Calcium phosphate, dibasic	.81	.76
Castor pomace, imp	21.00	20.00
Fish meal, Baltimore	48.00	46.00
Hoof meal, Chgo.	2.50	2.35
Jap. sardine meal	43.00	42.00
Tankage, N. Y. grd.	3.00	2.60
Ungrd.	3.00	2.50
Chicago	2.75	2.40
Imported	3.25	3.00

DECLINED

None.

Sulfate Output Halved

June production of ammonium sulfate by byproduct producers amounted to 55,934,000 lbs., as against 64,004,000 lbs. in May, a drop of 12.6%, and with 128,186,000 lbs. in June '37. For the first 6 months output totaled 404,211,000 lbs., as against 821,934,000 lbs. in the same months of last year, a cut of more than half.

Heavy Shipments of Arsenates

Demand for calcium arsenate has been excellent, and the volume this year probably will compare very favorably with that of the past few years. The lateness of the cotton crop and the weather conditions have been favorable for the boll weevil. Prices have been steady. The other agricultural insecticides, likewise, have been in good demand.

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Fats and Oils

Paint Oils Advanced Sharply

Fear of Shortage of Chinawood Again Starts Price Advance—Perilla, Oiticica, and Babassu in Sympathetic Rise—Corn, Peanut, and Soybean at Higher Levels—Refined Fish Oils Stronger—

The general price trend of the fats and oils was decidedly upward in the period under review. Offerings were generally light, while buying was heavier. The net result was a much firmer price feeling. Consumers are not yet inclined to rush into large forward commitments, but they are in the market in greater numbers as inventories drop sharply.

Much of the strength imparted to the market came from the sharp price reversal in Chinawood. Considerable apprehension is now being shown over the movement of oil out of China, and there is fear that if business should expand rapidly that prices would advance sharply. The strength in Chinawood was responsible for the higher quotations for other drying oils, notably perilla, babassu, and oiticica. Refined fish oils, likewise, were firmer after several weeks of weakness, but no actual alteration of the published price schedule was made. Some strength was also given to the refined fish oils because of the light offerings of crude oils at primary sources.

No appreciable change took place in coconut, although some shading was reported on the Pacific Coast. Corn oil, both crude and refined, moved higher. The same is true of peanut, while crude soybean was advanced sharply. Linseed moved out in better volume last month, and prices remained steady and unchanged.

A generally firmer tone was in evidence in the animal oils and fats. Cottonseed, both crude and refined, in common with most commodity markets moved higher in the past 30 days.

Paint manufacturers were in the market for drying oils in larger numbers last month than for some months past, indicating that inventories are low and also that some fear exists over supplies because of the unsettled conditions in the Far East which tend to become worse instead of better. Soapers were not quite so active in the last 30 days, but from the number of inquiries received it is quite apparent they are watching developments very closely, to determine if the current rise in commodity prices is really the beginning of a long period of rising prices.

June Tung Oil Exports

Tung oil continued to be reexported from Hong Kong in fair quantities in June, during which month a total of 5,804,000 lbs. were shipped to the U. S. and 401,600 lbs. to Europe, according to a radiogram received by the Commerce Dept.'s Chemical Division from the American Consulate General at Hong Kong.

In April, that port reexported a total of 8,912,400 lbs. of tung oil—7,071,000 lbs. of which were destined for the U. S. and the remainder for different countries in Europe.

At the end of June stocks of oil on hand at Hong Kong available for reexport were reported as being small—probably not more than 1,000 short tons. The Consulate General's radiogram, dated July 23, however, stated that stocks at that time were ample and that fair quantities were continuing to arrive from South and Central China.

According to growers, Gulf Coast states will produce close to 20,000,000 lbs. of tung nuts during the current year, which estimates indicate should yield 4,000,000 lbs. of oil.

Receipts of Drying Oils

Compared with May '37, imports of tung oil during the corresponding month of the current year declined in quantity from 14,010,400 to 4,515,000 lbs. and in value from $1,543,100 to $468,530. Receipts of perilla oil during these periods declined from 3,540,540 lbs. valued at $176,550 to 2,306,675 lbs. valued at $137,070. Receipts of oiticica oil, however, advanced in quantity from 111,550 to 329,364 lbs., and the recorded value from $9,170 to $28,000, preliminary statistics indicate.

Linseed Production, 2nd Quarter

Director of the Census, William L. Austin, announces that, according to preliminary figures, there were 19 mills in the U. S. which crushed flaxseed during the quarter ending June 30, reporting a crush of 111,681 tons of flaxseed and a production of 77,513,277 lbs. of linseed oil. These figures compare with 290,406 tons of seed crushed and 206,511,823 lbs. of oil produced for the corresponding quarter in '37; 144,709 tons of seed and 100,118,519 lbs. of oil in '36; 170,900 tons of seed and 116,946,404 lbs. of oil in '35; 140,462 tons of seed and 98,025,913 lbs. of oil in '34; and 119,508 tons of seed and 79,034,580 lbs. of oil in '33.

Stocks of flaxseed at the mills on June 30 amounted to 41,213 tons compared with 69,549 tons for the same date in '37, with 62,228 tons in '36, with 41,005 tons in '35, with 39,780 tons in '34, and with 23,901 tons in '33. Stocks of linseed oil reported by the crushers were 113,993,566 lbs. on June 30, '38, compared with 102,756,785 lbs. for the same date in '37, with 105,626,504 lbs. in '36, with 67,195,629 lbs. in '35, with 90,882,823 lbs. in '34, and with 59,191,846 lbs. in '33.

Important Price Changes

	July 31	June 30
ADVANCED		
Oil Babassu, tks.	$0.06 5/8	$0.06 3/8
Chinawood, drs.	.14 3/4	.12 1/8
tks.	.143	.11 1/2
Corn, crude, tks.	.08	.07 1/4
refined, bbls.	.10 1/4	.09 3/8
Lard, extra	.09 1/2	.09 1/4
prime edible	.12 1/4	.11 1/4
Menhaden, crude tks.	.30	.27
Oiticica, drs.	.12 1/4	.10
Oleo, No. 1	.09 1/4	.09
Peanut, crude tks.	.08 1/4	.07 1/4
refined edible, bbls.	.10 1/2	.10
Perilla, drs.	.10 3/4	.10 1/4
tks.	.10	.096
Soybean, crude, tks.	.067	.06
DECLINED		
Sardine, crude, tks.	$0.30	$0.36
Whale, refined, nat. drs.	.083	.08 1/2
winter bleach, drs.	.087	.089

Quarterly Production Figures

Director of the Census, William L. Austin, announces that factory production of fats and oils (exclusive of refined oils and derivatives) during the 3 month period ending June 30, was as follows: Vegetable oils, 527,428,168 lbs.; fish oil, 3,345,842 lbs.; animal fats, 419,459,934 lbs., and greases 80,157,729 lbs., a total of 1,030,391,673 lbs. Of the several kinds of fats and oils covered by this inquiry, the largest production, 263,882,355 lbs., appears for lard. Next in order is cottonseed oil with 233,004,011 lbs.; tallow with 154,757,724 lbs.; linseed oil with 77,513,277 lbs.; coconut oil with 70,477,228 lbs.; soybean oil with 63,462,531 lbs.; peanut oil with 31,444,029 lbs.; corn oil with 30,453,087 lbs.; castor with 9,972,980 lbs.; and babassu oil with 8,298,530 lbs.

Production of refined oils during the period was as follows: Cottonseed 316,998,904 lbs.; coconut 79,790,263 lbs.; peanut 26,015,477 lbs.; corn 28,408.890 lbs.; soybean 49,025,761 lbs.; palm-kernel 4,950,956 lbs.; palm 25,164,262 lbs.; and babassu 4,660,557 lbs.

Story of Glass

The August issue of *Priorities,* house organ of Prior Chemical Corp., N. Y. City, is devoted to the story of glass. The tradition is told of its first manufacture by a band of hungry sailors, as is the historical fact that rich Romans once hid their treasured window panes upon leaving home.

Opens N. Y. Office

The Cleaveland Laboratories & Mfg. Co., Newark, N. J., announce the opening of sales and executive offices in the General Motors Bldg., 1775 Broadway, N. Y. City. Sales of "No-Tarnish," "Maskalaco," the "Alaco" line and "Clearseal" will be controlled from this N. Y. City office.

Pigments and Fillers

Lead Pigments Priced Higher

Advance in Lead Forces Upward Revisions in Red Lead, Litharge, 35% and 50% Leaded Zinc Oxides—July was Probably the Best Month to Date in Raw Paint Materials—Casein Prices Unchanged—Paint and Coatings Makers Optimistic Over Fall Possibilities—

Important Price Changes

ADVANCED

	July 31	June 30
Lead, red, 95%	$0.074	$0.0725
97%	.0765	.075
98%	.079	.0775
Litharge	.064	.0625
White Lead	.06	.05¼
Zinc oxide leaded 35%	.059	.0565
50%	.0592	.0553

DECLINED

Phosphotungstic toners, 25 to 30c declines

Wood Retires

D. F. Wood, traffic manager of Binney & Smith Co. for the past 21 years, retired on July 1. He is succeeded by C. D. Macknee as traffic manager, J. D. Spruill becoming assistant traffic manager and Mr. G. Erath, chief clerk. A testimonial dinner was held for Mr. Wood on June 30 attended by the executives and other friends of Mr. Wood. After a one-month vacation Mr. Wood will remain as traffic consultant, being in the office one day a week.

United Changes Name

Name of United Color & Pigment, Newark, N. J., has been changed to the United Color & Pigment Co. Division of Interchemical Corp. There has been no change in the company's management or policies. United Color has been a subsidiary of Interchemical for some time.

Rowe on N.P.V.L.A. Board

Harold Rowe, National Lead vice-president, has been elected to the executive committee of the N.P.V.L.A., succeeding to the place held formerly by the late Edward J. Cornish. At the meeting of the committee in Chicago on July 14 a resolution in memory of Mr. Cornish was passed and presented to his sister, Mrs. A. V. Metcalf.

Earth Pigments

Receipts of mineral earth pigments declined from 2,522,000 lbs. valued at $134,700 in May '37 to 672,220 lbs. valued at $86,000 during the corresponding month of the current year, and chemical pigments from 2,155,000 lbs. valued at $77,735 to 1,331,000 lbs. valued at $47,700.

Marietta Expands

Marietta Paint & Color has purchased the business of the Stille-Young Co. in High Point, N. C. Reporting the transaction, George A. La Vallee, president of the Marietta company, states that John H. Kalte, manager for Stille-Young at High Point, has joined the Marietta organization together with the sales, production, and laboratory staffs of the Stille-Young High Point personnel.

Raw paint materials were in better demand in July than in June. Although some easing off in activity was apparent in the final week of the month the trade was quite optimistic over the fall outlook. Building and repair figures are encouraging and are expected to register still further gains, while the producers of industrial coatings are already beginning to expand operations in anticipation of a much busier fall. Sales of finished paints and varnishes in July were encouraging despite a week of almost uninterrupted rain in the eastern portion of the country.

Lead continues to rise. Red lead producers advanced carload quotations, but no change was made in the l.c.l. prices. Litharge and basic lead sulfate and blue lead were also quoted higher. The higher costs for lead also forced upward revisions of the 35% and 50% leaded zinc oxides. The one weak spot was in some of the natural varnish gums and this is reported on in the Natural Raw Materials Section. Likewise, the weakness in several of the important solvents is reviewed in detail in the Solvents and Plasticizers Section.

The firmness in casein remains unchanged, but no further advances in prices were introduced in the past 30 days. Carbon black shipments last month were in fair quantity and no new price developments occurred. The statistical story of carbon black in '37 will be found in the Statistical and Technical Data Section (blue sheets) this issue, under the title, "Pigments and Fillers."

The sharp advance in the lead pigments last month will have little practical effect for the current quarter, for contract prices were announced before the recent advance and even spot buyers were afforded ample opportunity to cover at the lower levels. Lithopone quotations remained unchanged last month from the higher levels established in June. A fair tonnage moved out into consuming channels.

May Paint Sales Disappointing

May paint sales continued to show restricted volume and were disappointing to the industry. Total sales reported by 680 establishments to the Bureau of the Census amounted to $36,827,421, as compared with $45,254,635 in May of last year. Sales for the first 5 months have amounted to $147,029,009, which compares quite unfavorably with $193,402,448 in the same months of '37.

Total industrial sales by 580 establishments in May was reported at $10,135,607, as against $16,785,249 a year ago, while the 5 months totals were $47,170,645 and $75,487,580, respectively. Trade sales were comparatively better, for the 5 months totals were $84,974,408 and $100,195,172. Industrial lacquer sales of only $13,890,838 in the first 5 months, as compared with $20,636,831 in the corresponding months of '37, reflect the lowly state of the automotive industry so far this year.

May calcimines total was reported at 6,972,494 lbs., as against 7,348,551 in April, and 8,096,527 in May of '37. Total for first 5 months reached 33,981,824 lbs., somewhat under the 38,909,212 lbs. for the same months of the previous year.

While the May paint figures were not encouraging a better feeling exists concerning the immediate months ahead. June deliveries of linseed almost equaled the '37 level and those made in July are thought to have at least equalled the volume of July '37. Greater modernization and building activity promises to make the fall season a fairly satisfactory one.

Five substantial monthly increases in the number of home builders, bringing owner-to-occupy residential activities during the initial half of '38 in the 37 eastern states to $171,526,000, has greatly cheered the building industry, according to the F. W. Dodge Corp.

Summarizing the encouraging trend of this classification of construction, the Dodge company points out that from $12,641,000 in January, contracts advanced steadily to $40,866,000 in June and that the latter figure was more than $2,500,000 better than the level reached in the like '37 month. May this year also topped the '37 mark by about $500,000.

Exports of pigments continued heavy in May, preliminary statistics indicate. Shipments of mineral earth pigments aggregated 2,275,000 lbs. valued at $50,000, against exports of 2,488,000 lbs. valued at $59,150 in the corresponding month of 1937. Exports of chemical pigments, chiefly carbon black, amounted to 16,808,000 lbs. valued at $783,200 in May which compares with 20,477,000 lbs. valued at $837,000 in the corresponding month of 1937.

Although well under levels prevailing at this time last year, exports of paint materials recovered somewhat during May, according to preliminary statistics.

Total exports of such products for the month aggregated $1,715,275, which compares with $1,465,000 during April and $2,021,400 for May last year.

Natural Raw Materials

Mixed Price Trend in Raw Materials

Buyers Showing More Interest in Forward Commitments—Spot Purchasing Heavier—Better Demand for Raw Tanning Materials—Japan Wax Declines—Bone Dry Shellac Advanced 1c—Slightly Improved Tone in Primary Naval Stores Markets

Buying of natural raw materials expanded in the past 30 days. The general rise in commodity markets had the effect of stabilizing confidence and buyers were anxious to cover part at least of their immediate requirements before prices worked into higher levels. However, there was still lacking any mass buying, or much buying in substantial quantities for future deliveries. Purchasing agents are still wary of long term commitments and are looking for additional evidence that the present bullish movement will be sustained and broadened over the fall months.

Raw natural tanstuffs were generally in good demand. Advances of $2 each were made late in the month for ground and leaf sumac because of the shortage of local stocks. The new prices are: ground, $67 per ton, and $69 for leaf. Myrobalans J1 at the month-end was quoted at $27.50, a gain of 50c per ton; a similar decline was reported in Mangrove bark, the new price being $24.50. Myrobalans J2 was off 50c, to a basis of $19.50, while Valonia beards dropped $2, to a $47 price level.

Japan Quoted Lower

The wax markets were generally quiet. In the face of light demand Japan was reduced ¾c and is now being quoted at 9¼c. This is practically replacement cost so that further weakness is not anticipated by the trade, even though the item is quite competitive at the moment. Shipments from Japan have been delayed because of the flood conditions in Kobe.

Certain grades of Carnauba moved higher, gains of ½c each being reported in No. 1 Yellow, No. 2 Yellow, and No. 2 North Country. Beeswax prices were fairly stable and a slightly better demand was noted.

Varnish Gums Weak

The general trend in the natural varnish gums was downward in the past 30 days, although only a relatively few direct price alterations were made in the published schedule. A few price changes were on the upward side of the market, such as the advances of ⅜c in Manilla DBB and WS. Demand has shown some improvement, which ordinarily would tend to strengthen the price situation, but stocks in primary markets are still large and replacement cables in many items indicate lower priced offerings. This condition tends to unsettle local quotations for the time being, at least.

Business in shellac still is quite dull, although July volume was slightly ahead of June. Bone Dry was advanced 1c, to a basis of 19c, but other grades remained unchanged. Foreign markets were steady with trading light.

A somewhat firmer tone was in evidence in the primary naval stores markets and slight price gains were registered in nearly all grades of gum rosin. Paper makers were fairly heavy purchasers. Shipments from the interior are heavy, but actual offerings are light, the major portion of the production going into storage subject to government loans. The net changes in the 30-day period at Savannah are shown below:

	July 29*	June 30	Net Gain or Loss Last Month
B	$3.50	$3.40	+$0.10
D	3.85	3.65	+ .15
E	4.25	3.90	+ .35
F	4.75	4.35	+ .40
G	4.75	4.65	+ .05
H	4.75	4.70	+ .05
I	4.75	4.70	+ .05
K	4.75	4.70	+ .05
M	4.80	4.70	+ .10
N	5.50	5.30	+ .20
WG	5.80	5.80	...
WW	6.30	6.35	— .05
X	6.40	6.35	+ .05
Turpentine	.23½	.23½	....

* Last trading day.

May Varnish Gum Imports

Imports of all types of varnish gums aggregated 5,246,000 lbs. valued at $369,000 in May, compared with 9,113,700 lbs. valued at $773,000 in the corresponding month of '37. Among the commodities making up this classification receipts of damar declined from 1,814,600 to 689,540 lbs.; kauri, from 261,700 to 10,000 lbs.; crude lac, from 1,844,000 to 1,801,000 lbs.; unbleached shellac, from 3,158,000 to 1,665,575 lbs.; and other varnish gums from 2,035,000 to 1,079,000 lbs.

Penick Expands

S. B. Penick & Co., well-known botanical drug house, has purchased and remodeled a spacious 5-story building at 10th and Brunswick sts., Jersey City, N. J., for a central assembly and distribution plant. Penick's manufacturing department is located at its plant at Lyndhurst, N. J. Executive offices are at 132 Nassau st., N. Y. City.

Veitch Retires

Dr. Fletcher P. Veitch, chief of the naval stores division of the Bureau of Chemistry and Soils, has retired after nearly 40 years of service. Carl Speh, who has been Dr. Veitch's assistant, is now chief of the division.

New Stokes Line

Arrangements have just been completed between Standard Machinery Co. of Mystic, Conn., and F. J. Stokes Machine Co., of Philadelphia, whereby the latter becomes sole sales agent for the complete line of Standard plastic molding presses.

Important Price Changes

ADVANCED

	July 31	June 30
Gum copal Manila MA	$0.06⅛	$0.05⅞
Myrobalans J 1	27.50	27.00
Shellac, bone dry	.19	.18
Sumac, grd.	67.00	65.00
Leaf	69.00	67.00
Wax Carnauba,		
No. 1 yellow	.41	.40½
No. 2 yellow	.40	.39½
N. C. 2	.37	.36½

DECLINED

Albumen, egg, dom.		
cryst.	$0.80	$0.82
Powdered	.85	.86
Imported	.80	.82
Gum damar, Singapore		
No. 1	.17	.17¾
No. 2	.11¼	.11¾
Mangrove bark	24.50	25.00
Myrobalans J 2	19.50	20.00
Valonia beards	45.00	47.00
Wax Japan	.09¼	.10

X-Rays in Industry

In recent years the use of X-rays and radium for inspection of important engineering structures has increased considerably. This is especially the case where failure would result in heavy economic losses, or where human safety is involved.

Recognizing this, the A.S.T.M. has recently organized Committee E-7 on Radiographic Testing. Following the usual procedure of the parent body the Committee membership includes producers of articles subject to X-ray inspection, users of products subjected to this inspection, makers of X-ray apparatus and radium capsules, and research workers.

The fundamental purpose of the Committee is to place the industrial use of radiography on a common sense basis.

Lohrer Dies

Conrad Lohrer, Sr., 75, president of the White Paste Co., 2320 Chestnut st., St. Louis, for about 30 years, died of a heart ailment on July 9 at St. John's Hospital after an illness of 3 weeks.

In New Locations

The Resinox Corporation announces removal of its office from 230 Park ave., N. Y. City, to 17 Battery pl., N. Y. City. The new telephone number is Whitehall 3-8593. John L. Buckner is president of the Resinox Corporation and Charles Lichtenberg is sales manager.

The O. Hommel Co. recently moved their N. Y. City office from 421 7 ave., to 200 W. 34 st.

Solvay's St. Louis office is now at 3615 Olive st., with M. S. Johnson as manager.

Wall St. Notes

Du Pont Reports 71c

Earnings of E. I. du Pont de Nemours showed a slight gain in the second quarter. Estimated net for the period was 71c a share, against 65c in the preceding quarter and $2.07 in the second quarter last year.

Du Pont received about 22c a share from its General Motors' dividends during the period, the same as in the first quarter, so that earnings from chemical operations were about 49c a share against 43c a share in the first quarter. A year ago du Pont had dividends for the quarter equal to 90c a share for G. M. and operating earnings of about $1.17 a share.

Du Pont de Nemours & Co. in preliminary report for six months ended June 30, states that the company earned $1.36 a share on its common stock, comparing with $3.41 a share in first six months of '37.

For quarter ended June 30, '38, indicated earnings (based on a comparison of company's reports for first quarter of fiscal year and the 6 months period) were equal to 71c a share, comparing with $2.07 a share in quarter ended June 30, '37, and 65c a share in quarter ended March 31, '38.

Air Reduction Net Up

Report of Air Reduction and wholly-owned subsidiaries for quarter ended June 30, subject to audit, shows net profit of $888,757 after depreciation, federal income taxes, etc., equal to 35c a share on 2,563,992 shares of capital stock. This compares with $2,289,498 or 90c a share on 2,542,601 shares in June quarter of previous year and $795,590 or 31c a share on 2,563,992 shares in March quarter of 1938.

For 6 months ended June 30, indicated net profit, as compiled from company's quarterly reports, was $1,684,347, equal to 66c a share, comparing with $4,240,437 or $1.67 a share for the 6 months ended June 30, 1938.

Victor Earns $119,297

Victor Chemical Works reports, for the quarter ended June 30, net profit of $119,297 after charges and federal income tax, but before deduction for undistributed profits tax, equivalent to 17c a share on the 696,000 shares of capital stock. This compares with $158,613 for the corresponding quarter of last year, equivalent, on the same share basis, to 23c a share.

Net profit for the 6 months ended June 30, '38, amounted to $275,544 or 39c a share, compared with $342,487 or 49c a share in first half of '37.

Chemical Fund, Inc., Offered July 15

As a Mutual Investing Company It Will Hold Stocks in Corporations Producing Raw Chemicals or Chemical Products—Du Pont Reports 71c a Share for 2nd Quarter—Earnings of Most Companies for June Quarter Show Improvement Over Previous 3 Months—

The increasing importance of the chemical industries in every field of economic activity is reflected in the public offering July 15 of 1,000,000 shares of Chemical Fund, Inc., by F. Eberstadt & Co., Inc. The purpose of the Fund is to provide a means of diversified investment in selected companies engaged in the chemical and chemical process industries.

An initial offering of 10,000 shares of the Fund was recently sold privately at the price of $10 per share. The price of the current public offering will vary from day to day according to the market fluctuations of the securities held by the Fund. Chemical Fund, Inc., has an authorized capitalization of 2,500,000 shares of $1 par value, of which 1,000,000 shares are currently offered. The company has no funded debt or preferred stock. All of its funds and securities will be held by the Commercial Trust Co. of N. J. as custodian.

It is the present intention of the company to qualify as a "mutual investment company" under the Federal Revenue Act of 1938, in order to take advantage of the special tax treatment accorded such companies under that Act.

According to the prospectus, the holdings of Chemical Fund, Inc., will be restricted to an approved list, subject to change as conditions indicate, of corporations producing raw chemicals or chemical products, and companies in whose operations the science of chemistry may play an increasingly vital part. Among such companies are those engaged in the manufacture of such products as Cellophane, drugs, explosives, fertilizers, glass, metal alloys, paints, paper, petroleum products, photographic materials, plastics, rayon, rubber, sugar, vegetable oils and soap.

The initial approved list of companies in which the Fund may invest contains, in addition to the strictly classified chemical companies, such corporations as Eastman Kodak, International Nickel, New Jersey Zinc, and Standard Oil of New Jersey, in view of the important part played by chemical processes in their industrial activities.

The management has retained the chemical and engineering firm of Arthur D. Little, Inc., of Cambridge, Mass., established in 1886, as consultants on technical aspects of the chemical industry, and to advise on trends and developments having a bearing on securities in or eligible for the company's portfolio.

Chemical Fund, Inc., has entered into an agreement with F. Eberstadt & Co., Inc., providing for general management and supervision of the company's affairs, subject to the Board of Directors, which includes Williams Haynes, Auguste Richard, F. Eberstadt, James J. Minot, Jr., Franz Schneider, Jr., Ernest C. Brelsford, and Maynard E. Simond.

Mathieson Alkali Earnings Up

Mathieson Alkali Works' earnings in the June quarter, amounting to 18c a common share, were slightly above the 16c a share reported in the first 3 months. In addition, there were substantial profits from export business during the period which were not included in the results. Earnings from this source normally are included in the report for the final quarter. The June quarter this year compares with 58c a share reported in the like period of 1937.

Mathieson reports for quarter ended June 30, net profit of $193,152 after depreciation, depletion, federal income and undistributed profits taxes, etc., equivalent after dividend requirements on 7 per cent. preferred stock, to 18c a share on 828,181 no-par shares of common stock. This compares with $516,726 or 58c a share on 830,428 common shares in June quarter of previous year and $172,400 or 16c a share on 828,181 common shares in quarter ended March 31, '38.

For 6 months ended June 30, net profit was $365,552 equal to 34c a share on 828,181 common shares, comparing with $993,778 or $1.10 a share on 830,428 common shares for the 6 months ended June 30, '37.

Dow Yearly Report

Report of Dow Chemical and subsidiaries for fiscal year ended May 31, 1938, certified by independent auditors, shows net profit of $3,895,269 after interest, depreciation, federal income and undistributed profits taxes, minority interest, etc., equal after preferred dividend requirements, to $3.91 a share on 945,000 shares of no-par common stock. For year ended May 31, 1937, net profit was $4,089,113, equal to $4.15 a share on common.

Current assets as of May 31, 1938, including $2,494,314 cash and U. S. Government securities, amounted to $13,276,543, and current liabilities were $3,343,732 compared with cash and U. S. Government securities of $4,187,328, current assets of $12,924,256 and current liabilities of $3,708,223 on May 31, 1937. Inventories were $8,425,316 against $6,278,534.

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Prices Current

Heavy Chemicals, Coal-tar Products, Dye-and-Tanstuffs, Colors and Pigments, Fillers and Sizes, Fertilizer and Insecticide Materials, Petroleum Solvents and Chemicals, Naval Stores, Fats and Oils, etc.

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f. o. b. works are specified as such. Import chemicals are so designated. Resale stocks when a market factor are quoted in addition to maker's prices and indicated "second hands."

Oils are quoted spot New York, **ex-dock**. Quotations f. o. b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f. o. b., or ex-dock. Materials sold f. o. b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both. Containers named are the original packages most commonly used.

Purchasing Power of the Dollar: 1926 Average—$1.00 - 1937 Average $1.10 - Jan. 1938 $1.20 - July 1938 $1.23

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Acetaldehyde, drs, c-l, wks lb.	...	.14	...	.14	...	.14
Acetaldol, 95%, 50 gal drs wks lb.	.21	.25	.21	.25	.21	.25
Acetamide, tech, lcl, kegs lb.	.39	.43	.32	.43	.32	.43
Acetanalid, tech, 150 lb bbls lb.	...	.32	.29	.32	.24	.29
Acetic Anhydride, drs, f.o.b. wks, frt all'd lb.	.10½	.11	.10½	.11	.13	.15
Acetin, tech, drs lb.	...	.33	...	.33	.22	.33
Acetone, tks, f.o.b. wks, frt all'd lb.	...	.04¾	...	.04¾	.04¾	.06½
drs, c-l, f.o.b. wks, frt all'd lb.	...	.05¾	...	.05¾	.05¾	.07½
Acetyl chloride, 100 lb cbys lb.	.55	.68	.55	.68	.55	.68
ACIDS						
Abietic, kgs, bbls lb.	.09¾	.10	.09¾	.10	.06¾	.10
Acetic, 28%, 400 lb bbls, c-l, wks 100 lbs.	...	2.23	...	2.23	2.23	2.53
glacial, bbls, c-l, wks 100 lbs.	...	7.62	...	7.62	7.62	8.70
glacial, USP, bbls, c-l, wks 100 lbs.	...	10.25	...	10.25	10.50	12.43
Acetylsalicylic, USP, 225 lb bbls lb.	...	.60	...	.60	.50	.60
Adipic, kgs, bbls lb.	...	.72	...	.72	...	.72
Anthranilic, ref'd, bbls lb.	1.15	1.20	1.15	1.20	.85	1.00
tech, bbls lb.	...	.75	...	.75	...	.75
Battery, cbys, wks 100 lbs.	1.60	2.55	1.60	2.55	1.35	2.60
Benzoic, tech, 100 lb kgs lb.	.43	.47	.43	.47	.43	.47
USP, 100 lb kgs lb.	.54	.59	.54	.59	.54	.59
Boric, tech, gran, 80 tons, bgs, delv ton *a*	...	96.00	95.00	96.00	...	95.00
Broenner's, bbls lb.	...	1.11	...	1.11	...	1.11
Butyric, edible, c-l, wks, cbys lb.	1.20	1.30	1.20	1.30	1.20	1.30
synthetic, c-l, drs, wks lb.	...	.22	...	.22	...	.22
wks, lcl lb.	...	.23	...	.23	...	.23
tks, wks lb.	...	.21	...	.21	...	.21
Camphoric, drs lb.	5.50	5.70	5.50	5.70	5.50	5.70
Chicago, bbls lb.	...	2.10	...	2.10	...	2.10
Chlorosulfonic, 1500 lb drs, wks lb.	.03½	.05	.03½	.05	.03½	.05
Chromic, 99¾%, drs, delv lb.	.15¼	.17¼	.15¼	.17¼	.15¼	.16¾
Citric, USP, crys, 230 lb bbls lb. *b*	.23	.24	.23	.25	.24	.26
anhyd, gran, bbls lb. *b*	...	.25½	.25½	.26½	.26½	.29
Cleve's, 250 lb bbls lb.	.50	.52	.50	.52	.50	.52
Cresylic, 99%, straw, HB, drs, wks, frt equal gal.	.73	.74	.73	.91	.72	.91
99%, straw, LB, drs, wks, frt equal gal.	.78	.86	.78	.94	.77	.94
resin grade, drs, wks, frt equal lb.	.09¼	.09¾	.09¼	.11¼	.09	.11¼
Crotonic, bbls, delv lb.	.21	.50	.21	1.00	.75	1.00
Formic, tech, 140 lb drs lb.	.10½	.11½	.10½	.11½	.10½	.13
Fumaric, bbls lb.	...	.60	...	.60	...	.60
Fuming, see Sulfuric (Oleum)						
Gallic, tech, bbls lb.	.75	.79	.75	.79	.65	.75
USP, bbls lb.	.87	.91	.87	.91	.77	.91
Gamma, 225 lb bbls, wks lb.	...	.85	...	.85	...	.85
H, 225 lb bbls, wks lb.	.50	.55	.50	.55	.50	.55
Hydriodic, USP, 47% bottles lb.	...	2.30	2.20	2.30	...	...
Hydrobromic, 34% conct 155 lb cbys, wks lb.	.42	.44	.42	.44	.40	.42
Hydrochloric, see muriatic						
Hydrocyanic, cyl, wks lb.	.80	1.30	.80	1.30	.80	1.30
Hydrofluoric, 30%, 400 lb bbls, wks lb.	.07	.07½	.07	.07½	.07	.07½
Hydrofluosilicic, 35%, 400 bbls, wks lb.	.10½	.15	.10½	.15	.10½	.15
Lactic, 22%, dark, 500 lb bbls lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
22%, light ref'd, bbls lb.	.03½	.03¾	.03½	.03¾	.03½	.03¾
44%, light, 500 lb bbls lb.	.05½	.05¾	.05½	.05¾	.05½	.05¾
44%, dark, 500 lb bbls lb.	.06½	.06¾	.06½	.06¾	.06½	.06¾
50%, water white, 500 lb bbls lb.	.10½	.11½	.10½	.11½	.10½	.11½
USP X, 85%, cbys lb.	.42	.45	.42	.45	.42	.50
Lauric, drs lb.	.08½	.09	.08½	.09	...	...
Laurent's, 250 lb bbls lb.	.45	.46	.45	.46	.45	.46
Levulinic, 5 lb bot, wks lb.	...	2.00	...	2.00	...	...
Linoleic, bbls lb.	...	.20	...	.20	.16	.20
Maleic, powd, kgs lb.	.30	.40	.30	.40	.29	.40
Malic, powd, kgs lb.	.45	.60	.45	.60	.45	.60
Metanillic, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Mixed, tks, wks N unit	.06½	.07¼	.06½	.07¼	.06½	.07¼
S unit	.008	.009	.008	.009	.008	.009
Monochloracetic, tech, bbls lb.	.16	.18	.16	.18	.16	.18
Monosulfonic, bbls lb.	1.50	1.60	1.50	1.60	1.50	1.60
Muriatic, 18°, 120 lb cbys, c-l, wks 100 lb.	...	1.50	...	1.50	1.35	1.50
tks, wks 100 lb.	...	1.00	...	1.00	...	1.00
20°, cbys, c-l, wks 100 lb.	...	1.75	...	1.75	1.45	1.75
tks, wks 100 lb.	...	1.10	...	1.10	...	1.10
22°, c-l, cbys, wks 100 lb.	...	2.25	...	2.25	1.95	2.25
tks, wks 100 lb.	...	1.60	...	1.60	...	1.60
CP, cbys lb.	.06½	.07½	.06½	.07½	.06½	.07½
N & W, 250 lb bbls lb.	.85	.87	.85	.87	.85	.87
Naphthenic, 240-280 s.v., drs lb.	.10	.13	.10	.13	.10	.14
Sludges, drs lb.	...	.05	...	.05	.05	.10
Naphthionic, tech, 250 lb bbls lb.	.60	.65	.60	.65	.60	.65
Nitric, 36°, 135 lb cbys, c-l, wks 100 lb. *e*	...	5.00	...	5.00	...	5.00
38°, c-l, cbys, wks 100 lb. *e*	...	5.50	...	5.50	...	5.50
40°, cbys, c-l, wks 100 lb. *e*	...	6.00	...	6.00	...	6.00
42°, c-l, cbys, wks 100 lb. *e*	...	6.50	...	6.50	...	6.50
CP, cbys, delv lb.	.11½	.12½	.11½	.12½	.11½	.12½
Oxalic, 300 lb bbls, wks, or N Y lb.	.10¾	.12	.10¾	.12	.10¾	.12
Phosphoric, 85%, USP, cbys lb.	.12	.14	.12	.14	.12	.14
50%, acid, c-l, drs, wks lb.	.06	.08	.06	.08	.06	.08
75%, acid, c-l, drs, wks lb.	.09	.10½	.09	.10½	.09	.10½
Picramic, 300 lb bbls, wks lb.	.65	.70	.65	.70	.65	.70
Picric, kgs, wks lb.	.35	.40	.35	.40	.35	.40
Propionic, 98% wks, drs lb.	...	.22	...	.22	.20	.22
80% lb.	.16	.17½	.16	.17½	.16	.17½
Pyrogallic, tech, lump, pwd, bbls lb.	...	1.05	...	1.05	...	...
cryst, USP lb.	1.45	1.63	1.45	1.63	1.30	1.48
Ricinoleic, bbls lb.	...	.35	.35	.38	.35	.38
tech, bbls lb.	...	.13	...	.13	...	...
Salicylic, tech, 125 lb bbls, wks lb.	...	.33	...	.33	...	.33
USP, bbls lb.	.40	.45	.40	.45	...	...
Sebacic, tech, drs, wks lb.	.37	.41	.37	.41	.37	.41
Succinic, bbls lb.	...	.75	...	.75	...	.75
Sulfanilic, 250 lb bbls, wks lb.	.17	.18	.17	.18	.17	.18
Sulfuric, 60°, tks, wks ton	...	13.00	...	13.00	12.00	13.00
c-l, cbys, wks 100 lb.	...	1.25	...	1.25	1.10	1.25
66°, tks, wks ton	...	16.50	...	16.50	15.50	16.50
c-l, cbys, wks 100 lb.	...	1.50	...	1.50	1.35	1.50
CP, cbys, wks lb.	.06½	.07½	.06½	.07½	.06½	.07½
Fuming (Oleum) 20% tks, wks ton	...	18.50	...	18.50	...	18.50
Tannic, tech, 300 lb bbls lb.	.40	.47	.40	.47	.19	.47
Tartaric, USP, gran, powd, 300 lb bbls lb.	.27¼	.27¾	.24¼	.27¾	.21¾	.25¼
Tobias, 250 lb bbls lb.	.65	.67	.65	.67	.65	.67
Trichloroacetic bottles lb.	2.00	2.50	2.00	2.50	2.00	2.50
kgs lb.	...	1.75	...	1.75	...	1.75
Tungstic, tech, bbls lb.	no price					
Vanadic, drs, wks lb.	1.10	1.20	1.10	1.20	1.10	1.20
Albumen, light flake, 225 lb bbls lb.	.52	.60	.52	.60	.47	.60
dark, bbls lb.	.13	.18	.11	.18	.11	.17
egg, edible lb.	.80	.82	.80	1.15	.76	1.15
vegetable, edible lb.	.74	.78	.74	.78	.76	.78
Alcohol, Amyl (from Pentane) tks, delv lb.	...	.106	.106	.123	...	.123
c-l, drs, delv lb.	...	.116	.116	.133	...	.133
lcl, drs, delv lb.	...	.126	.126	.143	...	.143
Amyl, secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
drs, c-l, delv E. of Rockies lb.	...	.09½	...	.09½	...	...
Benzyl, cans lb.	.68	1.00	.68	1.00	.65	1.10
Butyl, normal, tks, f.o.b. wks, frt all'd lb. *d*	...	.08½	.08½	.09	.08½	.09
c-l, drs, f.o.b. wks, frt all'd lb. *d*	...	.09½	.09½	.10	.09½	.10
Butyl, secondary, tks, delv lb. *d*	...	.06	...	.06	.06	.07
c-l, drs, delv lb. *d*	...	.07	...	.07	.07	.08
Capryl, drs, tech, wks lb.	...	.85	...	.85	...	.85
Cinnamic, bottles lb.	2.00	2.50	2.00	2.50	2.00	3.65
Denatured, CD, 14, 13, c-l, drs, wks gal. *c*	...	.33	.33	.35	.33	.35
tks, East, wks gal.	...	.25	.25	.29	...	...
Western schedule, c-l, drs, wks gal. *e*	...	.36	.36	.38	.37	.39
Denatured, SD, No. 1, tks ...	...	.23	.23	.27	.26	.27
c-l, drs, wks gal. *e*	...	.29	.29	.33	.32	.33

a Powdered boric acid $5 a ton higher in each case; USP $15 higher; *b* Powdered citric is ½c higher; kegs are in each case ½c higher than bbls.; *y* Price given is per gal.

c Yellow grades 25c per 100 lbs. less in each case; *d* Spot prices are 1c higher; *e* Anhydrous is 5c higher in each case; *f* Pure prices are 1c higher in each case.

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Prices—Current

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Alcohols (continued):					
Diacetone, pure, c-l, drs, delv lb. *f*	...	.11½	...	.11½	...	.11½
tech, contract, drs, c-l, delv lb.	...	.10½	...	.10½	...	...
Ethyl, 190 proof, molasses, tks gal. *g*	...	4.49½	4.04	4.51½	4.05	4.07
c-l, drs gal. *g*	...	4.55½	4.10	4.59½	4.11	4.12
c-l, bbls gal. *g*	...	4.56½	4.11	4.58½	4.12	4.13
absolute, drs gal. *g*	4.88	4.95	4.40	4.93	4.54	6.08½
Furfuryl, tech, 500 lb drs lb.	.30	.35	.30	.35	.30	.35
Hexyl, secondary tks, delv lb.	...	.12	...	.12	.11½	.12
c-l, drs, delv lb.	...	.13	...	.13	.12½	.13
Normal, drs, wks lb.	3.25	3.50	3.25	3.50	3.25	3.50
Isoamyl, prim, cans, wks lb.	...	.32	...	.32	...	.32
drs, lcl, delv lb.	...	.27	...	.27	...	.27
Isobutyl, ref'd, lcl, drs lb.	...	.10	...	.10	...	.10
c-l, drs lb.	...	.09½	...	.09½	...	.09½
tks lb.	...	.08½	...	.08½	...	.08½
Isopropyl, ref'd, 91%, c-l, drs, f.o.b. wks, frt all'd lb.	...	.36	...	.36	.39½	.45
Ref'd 98%, drs. f.o.b. wks, frt all'd gal.	...	.41	...	.41	...	...
Tech 91%, drs, above terms gal.	...	.33½	...	.33½	...	...
tks, same terms gal.	...	.28½	...	.28½	...	...
Tech 98%, drs, above terms gal.	...	.37½	...	.37½	...	...
tks, above terms gal.	...	.32½	...	.32½	...	...
Spec Solvent, tks, wks gal.	...	.24	.24	.28	.27	.28
Aldehyde ammonia, 100 gal drs lb.	.80	.82	.80	.82	.80	.82
Aldehyde Bisulfite, bbls, delv lb.	...	.17	...	.17	...	...
Aldol, 95%, 55 and 110 gal drs, delv lb.	...	.20	...	.20	...	...
Alphanaphthol, crude, 300 lb bbls lb.	...	.52	...	.52	...	.52
Alphanaphthylamine, 350 lb bbls lb.	.32	.34	.32	.34	.32	.34
Alum, ammonia, lump, c-l, bbls, wks 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
delv NY, Phila 100 lb.	...	3.40	...	3.40	3.15	3.40
Granular, c-l, bbls, wks 100 lb.	3.15	3.40	3.15	3.40	2.75	3.00
Powd, c-l, bbls, wks 100 lb.	...	3.55	...	3.55	3.15	3.40
Chrome, bbls 100 lb.	6.50	6.75	6.50	6.75	6.50	7.25
Potash, lump, c-l, bbls, wks 100 lb.	3.65	3.90	3.65	3.90	3.25	3.50
Granular, c-l, bbls, wks 100 lb.	3.40	3.65	3.40	3.65	3.00	3.25
Powd, c-l, bbls, wks 100 lb.	3.80	4.05	3.80	4.05	3.40	3.65
Soda, bbls, wks 100 lb.	...	3.25	...	3.25	...	3.25
Aluminum metal, c-l, NY 100 lb.	...	20.00	...	20.00	19.00	20.00
Acetate, 20%, bbls lb.	.07½	.09	.07½	.10	.09	.10
Basic powd, bbls, delv lb.	.40	.50	.40	.50	...	...
Chloride anhyd, 99%, wks lb.	.07	.12	.07	.12	.07	.12
93%, wks lb.	.05	.08	.05	.08	.05	.08
Crystals, c-l, drs, wks lb.	.06	.06¼	.06	.06¼	.06	.06¼
Solution, drs, wks lb.	.02¾	.03¼	.02¾	.03¼	.02¾	.03¼
Formate, 30% sol bbls, c-l, delv lb.	...	.13	...	.13	...	...
Hydrate, 96%, light, 90 lb bbls, delv lb.	.12	.13	.12	.13	.13	.15
heavy, bbls, wks lb.	.029	.03½	.029	.03½	.029	.03½
Oleate, drs lb.	.16¾	.18½	.16¾	.18½	.16¾	.18½
Palmitate, bbls lb.	...	.23	...	.23	.22	.23
Resinate, pp., bbls lb.	...	.15	...	.15	...	.15
Stearate, 100 lb bbls lb.	.19	.21	.19	.21	.19	.21
Sulfate, com, c-l, bgs, wks 100 lb.	...	1.15	1.15	1.35	...	1.35
c-l, bbls, wks 100 lb.	...	1.35	1.35	1.55	...	1.55
Sulfate, iron-free, c-l, bgs, wks 100 lb.	...	2.00	...	2.00	...	1.90
c-l, bbls, wks 100 lb.	...	2.20	...	2.20	...	2.05
Aminoazobenzene, 110 lb kgs lb.	...	1.15	...	1.15	...	1.15
Ammonia anhyd fert com, tks lb.	.04½	.05½	.04½	.05½	.04½	.05½
Ammonia anhyd, 100 lb cyl lb.	.16	.22	.16	.22	.16	.22
26°, 800 lb drs, delv lb.	.02¼	.02½	.02¼	.02½	.02¼	.02½
Aqua 26°, tks, NH cont.	...	.05	...	.05	.04½	.05
tk wagon lb.	...	.02	...	.02	...	.02
Ammonium Acetate, kgs lb.	.26	.33	.26	.33	.26	.33
Bicarbonate, bbls, f.o.b. wks 100 lb.	5.15	5.71	5.15	5.71	5.15	5.71
Bifluoride, 300 lb bbls lb.	.14½	.16½	.14½	.17	.16	.17
carbonate, tech, 500 lb bbls lb.	.08	.12	.08	.12	.08	.12
Chloride, White, 100 lb bbls, wks 100 lb.	4.45	4.90	4.45	4.90	4.45	4.90
Gray, 250 lb bbls, wks 100 lb.	5.50	6.25	5.50	6.25	5.00	6.25
Lump, 500 lbs cks spot lb.	.10½	.11	.10½	.11	.10½	.11
Lactate, 500 lb bbls lb.	.15	.16	.15	.16	.15	.16
Laurate, bbls lb.	...	.23	...	.23	...	...
Linoleate, 80% anhyd, bbls lb.	...	.15	...	.15	.11	.15
Naphthenate, bbls lb.	...	.17	...	.17	...	...
Nitrate, tech, cks lb.	.038	.0405	.038	.0405	.03¾	.04
Oleate, drs lb.	...	.15	...	.15	.15	.10
Oxalate, neut, cryst, powd, bbls lb.	.19	.20	.19	.22½	.22½	.23
Perchlorate, kgs lb.	...	.16	...	.16	...	.16
Persulfate, 112 lb kgs lb.	.21	.24	.21	.24	.21	.24
Phosphate, dibasic tech, powd, 325 lb bbls lb.	.07½	.10	.07½	.10	.07½	.10
Ricinoleate, bbls lb.	...	.15	...	.15	...	...
Stearate, anhyd, bbls lb.	...	.24	...	.24	...	...
Paste, bbls lb.	...	.07½	...	.07½	...	...

g Grain alcohol 20c a gal. higher in each case.

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	Current Market	1938 Low	1938 High	1937 Low	1937 High
Ammonium (continued).					
Sulfate, dom, f.o.b., bulk ton	...	26.75	26.50	28.50	26.00	28.00
Sulfocyanide, pure, kgs. lb.	...	.55	...	.55	...	.55
Amyl Acetate (from pentane)						
tks, delv lb.	...	.10	.10	.11½	...	.11½
tech, drs, delv lb.	...	.11	.11	.12	.11½	.13½
Secondary, tks, delv lb.	...	.08½	...	.08½	...	.08½
c-l, drs, delv lb.	...	.09½	...	.09½	...	.09½
tks, delv lb.	...	.08½	...	.08½	...	.08½
Chloride, norm, drs, wks lb.	.56	.68	.56	.68	.56	.68
mixed, drs, wks lb.	.07	.077	.07	.077	.07	.077
tks, wks lb.	...	.06	...	.06	...	.06
Mercaptan, drs, wks lb.	...	1.10	...	1.10	...	1.10
Oleate, lcl, wks, drs lb.	...	.25	...	.25	...	.25
Stearate, lcl, wks, drs lb.	...	.26	...	.26	...	.26
Amylene, drs, wks lb.	.102	.11	.102	.11	.102	.11
tks, wks lb.	...	.09	...	.09	...	.09
Aniline Oil, 960 lb drs and tks lb.	.14½	.17½	.14½	.17½	.15	.17½
Annatto fine lb.	.34	.37	.34	.37	.34	.37
Anthracene, 80% lb.	...	.75	...	.75	...	.75
40% lb.	...	.18	...	.18	...	.18
Anthraquinone, sublimed, 125 lb bbls lb.	...	.65	...	.65	.50	.65
Antimony metal slabs, ton lots lb.	...	.10¾	.10¾	.14	.13⅝	.17¼
Butter of, see Chloride.						
Chloride, soln cbys lb.	...	.17	...	.17	...	.17
Needle, powd, bbls lb.	.12½	.14	.12½	.16	.14	.19½
Oxide, 500 lb bbls lb.	.11½	.12½	.11½	.16½	.14¼	.16½
Salt, 63% to 65%, tins lb.	.26	.27	.26	.27	.22	.24
Sulfuret, golden, bbls lb.	.22	.23	.22	.23	.22	.23
Archil, conc, 600 lb bbls lb.	.21	.27	.21	.27	.21	.27
Double, 600 lb bbls lb.	.18	.20	.18	.20	.18	.20
Aroclors, wks lb.	.18	.30	.18	.30	.18	.30
Arrowroot, bbl lb.	.08½	.09	.08½	.09	.08½	.09¾
Arsenic, Metal lb.	.42	.44	.42	.44	.42	.44
Red, 224 lb cs kgs lb.	...	.15¾	...	.15¾	...	.15¾
White, 112 lb kgs lb.	.03	.04	.03	.04	.03	.04
Barium Carbonate precip, 200 lb bgs, wks ton	52.50	62.50	52.50	62.50	52.50	62.50
Nat (witherite) 90% gr, c-l, wks, bgs ton	41.00	43.00	41.00	44.00	42.00	45.00
Chlorate, 112 lb kgs, NY lb.	.16½	.17½	.16½	.17½	.16½	.17½
Chloride, 600 lb bbls, delv, zone 1 ton	77.00	92.00	77.00	92.00	74.00	92.00
Dioxide, 88%, 690 lb drs lb.	.11	.12	.11	.12	.11	.12
Hydrate, 500 lb bbls lb.	.04¾	.05½	.04¾	.05½	.04¾	.05½
Nitrate, bbls lb.	.07	.08¼	.07	.08¼	.07	.08¼
Barytes, floated, 350 lb bbls c-l, wks ton	...	23.65	...	23.65	...	23.65
Bauxite, bulk, mines ton	7.00	10.00	7.00	10.00	7.00	10.00
Bentonite, c-l, 325 mesh, bgs, wks ton	...	16.00	...	16.00	...	16.00
200 mesh ton	...	11.00	...	11.00	...	11.00
Benzaldehyde, tech, 945 lb drs, wks lb.	.60	.62	.60	.62	.60	.62
Benzene (Benzol), 90%, Ind, 8000 gal tks, ft all'd gal.	...	.16	...	.16	...	.16
90% c-l, drs gal.	...	.21	...	.21	...	.21
Ind pure, tks, frt all'd gal.	...	.16	...	.16	...	.16
Benzidine Base, dry, 250 lb bbls lb.	.70	.72	.70	.72	.70	.72
Benzoyl Chloride, 500 lb drs lb.	.40	.45	.40	.45	.40	.45
Benzyl Chloride, 95-97% rfd, drs lb.	.30	.40	.30	.40	.30	.40
Tech, drs lb.	.25	.26	.25	.26	.25	.26
Beta-Naphthol, 250 lb bbl, wks lb.	.23	.24	.23	.24	.23	.24
Naphthylamine, sublimed, 200 lb bbls lb.	1.25	1.35	1.25	1.35	1.25	1.35
Tech, 200 lb bbls lb.	.51	.52	.51	.52	.51	.52
Bismuth metal lb.	1.05	1.15	1.00	1.10	1.00	1.10
Chloride, boxes lb.	3.20	3.25	3.20	3.25	3.20	3.25
Hydroxide, boxes lb.	3.15	3.20	3.15	3.20	3.15	3.20
Oxychloride, boxes lb.	...	2.95	...	2.95	2.75	3.04
Subbenzoate, boxes lb.	3.25	3.30	3.25	3.30	3.25	3.30
Subcarbonate, kgs lb.	1.13	1.16	1.13	1.58	1.23	1.58
Trioxide, powd, boxes lb.	...	3.57	...	3.57	3.45	3.57
Subnitrate, fibre, drs lb.	1.03	1.06	1.03	1.48	1.22	1.48
Blackstrap, cane (see Molasses, Blackstrap).						
Blanc Fixe, 400 lb bbls, wks ton *h*	40.00	75.00	40.00	75.00	40.00	75.00
Bleaching Powder, 800 lb drs, c-l, wks, contract 100 lb.	...	2.00	...	2.00	...	2.00
lcl, drs, wks lb.	2.25	3.60	2.25	3.60	2.25	3.60
Blood, dried, f.o.b., NY unit	...	3.10	2.50	3.10	3.10	4.30
Chicago, high grade unit	...	3.00	2.35	3.35	3.00	4.65
Imported shipt unit	...	3.35	2.90	3.45	3.25	4.10
Blues, Bronze Chinese Milori						
Prussian Soluble lb.	.36	.37	.36	.37	.36	.37
Ultramarine,* dry, wks, bbls lb.	...	.11	...	.11	.10	.11
Regular grade, group 1 lb.	...	.16	...	.16	.15	.16
Special, group 1 lb.	...	.19	...	.19	.18	.19
Pulp, No. 1 lb.	...	.27	...	.27	.26	.27
Bone, 4½ + 50% raw, Chicago ton	27.00	29.00	25.50	30.00	26.00	30.00
Bone Ash, 100 lb kgs lb.	.06	.07	.06	.07	.06	.07
Black, 200 lb bbls lb.	.06½	.08¼	.06½	.08¼	.05½	.08¼
Meal, 3% & 50%, imp ton	22.00	23.00	20.50	23.75	23.75	27.75
Domestic, bgs, Chicago ton	20.00	23.00	16.00	23.00	19.00	27.00
Borax, tech, gran, 80 ton lots, sacks, delv ton *i*	...	43.00	42.00	43.00	40.00	42.00
bbls, delv ton *i*	...	53.00	52.00	53.00	50.00	52.00

h Lowest price is for pulp, highest for high grade precipitated; *i* Crystals $6 per ton higher; USP, $15 higher in each case; * Freight is equalized in each case with nearest producing point.

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Borax (continued):					
Tech, powd, 80 ton lots, sacks ton *j*	...	47.00	...	47.00	45.00	47.00
bbls, delv ton *j*	...	57.00	...	57.00	56.00	57.00
Bordeaux Mixture, drs ... lb.	.11	.11½	.11	.11½	.10½	.11
Bromine, cases lb.	.30	.43	.30	.43	.30	.43
Bronze, Al, pwd, 300 lb drs lb.	.90½	.92½	.90½	.92½	.80	1.50
Gold, blk lb.	.45	.65	.45	.65	.40	.65
Butanes, com 16-32* group 3 tks lb.	.02¼	.03¾	.02¼	.03¾	.02¼	.03¾
Butyl, Acetate, norm drs, frt allowed lb.	.09½	.10	.09½	.10½	.10	.10½
tks, frt allowed lb.	...	.08½	.08½	.09	...	.09
Secondary, tks, frt allowed lb.	...	.06½	.06½	.07	.07	.07½
drs, frt, allowed lb.	.07½	.08	.07½	.08½	.08	.09
Aldehyde, 50 gal drs, wks lb.	.16½	.17½	.16½	.17½	.16½	.17½
Carbinol, norm drs, wks lb.	.60	.75	.60	.75	.60	.75
Crotonate, norm, 55 and 110 gal drs, delv ... lb.	...	.36	...	.36	...	...
Lactate lb.	.22½	.23½	.22½	.23½	.22½	.23½
Oleate, drs, frt allowed .. lb.	...	.25	...	.25	...	.25
Propionate, drs lb.	.18	.18½	.18	.18½	.18	.18½
tks, delv lb.	...	.17	...	.17	...	.17
Stearate, 50 gal drs ... lb.	...	.26	...	.26	.25	.26
Tartrate, drs lb.	.55	.60	.55	.60	.55	.60
Butyraldehyde, drs, lcl, wks lb.	...	.35½	...	.35½	...	.35½
Cadmium Metal lb.	...	1.20	1.20	1.60	1.05	1.60
Sulfide, orange, boxes .. lb.	1.50	1.60	1.50	1.60	.90	1.60
Calcium, Acetate, 150 lb bgs c-l, delv 100 lb.	...	1.65	...	1.65	1.65	2.25
Arsenate, c-l, E. of Rockies, dealers, drs lb.	.06¾	.07¼	.06¾	.07¼	.06¼	.07¾
Carbide, drs lb.	.05	.06	.05	.06	.05	.06
Carbonate, tech, 100 lb bgs c-l lb.	...	1.00	...	1.00	...	1.00
Chloride, flake, 375 lb drs, burlap bgs, c-l, delv.. ton	...	22.00	22.00	23.50	22.00	23.50
paper bgs, c-l, delv ... ton	23.00	36.00	23.00	36.00	...	...
Solid, 650 lb drs, c-l, delv ton	...	20.00	20.00	21.50	20.00	21.50
Ferrocyanide, 350 lb bbls wks lb.	...	.17	...	.17	...	.17
Gluconate, Pharm, 125 lb bbls lb.	.50	.57	.50	.57	.50	.57
Levulinate, less than 25 bbl lots, wks lb.	...	3.00	...	3.00	...	...
Nitrate, 100 lb bgs ton	...	28.00	...	28.00	26.10	28.00
Palmitate, bbls lb.	.22	.23	.22	.23	.22	.23
Phosphate, tribasic, tech, 450 lb bbls lb.	.06½	.07½	.06½	.07½	.06½	.07½
Resinate, precip, bbls ... lb.	.13	.14	.13	.14	.13	.14
Stearate, 100 lb bbls ... lb.	.19	.21	.19	.21	.19	.21
Camphor, slabs lb.	.52½	.53	.52½	.56	.54	.56
Powder lb.	.52½	.53	.52½	.56	.54	.56
Camwood, Bk, ground bbls lb.	.16	.18	.16	.18	.16	.18
Carbon Bisulfide, 500 lb drs lb.	.05	.05¾	.05	.05¾	.05	.05¾
Black, c-l, bgs, delv, price varying with zone† .. lb.	.027	.0380	.027	.0380	.0320	.0535
lcl, bgs, f.o.b. whse .. lb.	...	.05¾	...	.05¾	.06½	.07
cartons, f.o.b. whse .. lb.	...	.06¼	...	.06¼	.07	.07¾
cases, f.o.b. whse ... lb.	...	.07	...	.07	.07¾	.08¼
Decolorizing, drs, c-l ... lb.	.08	.15	.08	.15	.08	.15
Dioxide, Liq 20-25 lb cyl lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, 55 or 110 gal drs, c-l, delv lb.	.05¼	.06	.05¼	.06	.05¼	.06
Casein, Standard, Dom, grd lb.	.08	.10½	.06½	.13½	.11	.20¾
80-100 mesh, c-l, bgs ... lb.	.08½	.11	.07	.14	.11½	.21¼
Castor Pomace, 5½ NH_3, c-l, bgs, wks ton	...	18.50	18.50	21.00	21.00	25.00
Imported, ship, bgs ... ton	...	21.00	...	21.00	nom.	17.00
Celluloid, Scraps, ivory cs lb.	.12	.15	.12	.15	.12	.15
Transparent, cs lb.	...	.20	...	.20	...	.20
Cellulose, Acetate, 50 lb kgs lb.	...	.40	...	.40	.40	.55
Chalk, dropped, 175 lb bbls lb.	.03	.03¾	.03	.03¾	.03	.03¾
Precip, heavy, 560 lb cks lb.	.03	.04	.03	.04	.03	.04
Light, 250 lb cks lb.	.03¼	.04	.03¼	.04	.03	.04
Charcoal, Hardwood, lump, blk, wks bu.	...	.15	...	.15	...	.15
Softwood, bgs, delv* ... ton	23.00	34.00	23.00	34.00	23.00	34.40
Willow, powd, 100 lb bbl, wks lb.	.06	.07	.06	.07	.06	.07
Chestnut, clarified, tks, wks lb.	...	.02125	...	.02125	.01625	.02125
25%, bbls, wks lb.	...	.0225	...	.0225	.02	.0225
Pwd, 60%, 100 lb bgs, wks lb.	...	.04⅞	...	.04⅞	...	.04⅞
China Clay, c-l, blk mines ton	...	7.00	...	7.00	6.50	7.00
Imported, lump, blk ... ton	22.00	25.00	22.00	25.00	22.00	25.00
Chlorine, cyls, lcl, wks, contract lb.	.07½	.08½	.07½	.08½	.07½	.08½
cyls, c-l, contract ... lb. *j*	...	.05½	...	.05½	...	.05½
Liq, tk, wks, contract 100 lb.	...	2.15	...	2.15	...	2.15
Multi, c-l, cyls, wks, cont lb.	2.30	2.55	2.30	2.55	2.30	2.55
Chloroacetophenone, tins, wks lb.	3.00	3.50	3.00	3.50	3.00	3.50
Chlorobenzene, Mono, 100 lb drs, lcl, wks lb.	.06	.07½	.06	.07½	.06	.07½
Chloroform, tech, 1000 lb drs lb.	.20	.21	.20	.21	.20	.21
USP, 25 lb tins lb.	.30	.31	.30	.31	.30	.31
Chloropicrin; comml cyls .. lb.	...	.80	...	.80	...	.80
Chrome, Green, CP lb.	.21	.25	.21	.25	.20	.25
Yellow lb.	.14½	.15½	.14½	.15½	.13	.16½

j A delivered price; * Depends upon point of delivery; † New bulk price, tank cars ¼c per lb. less than bags in each zone.

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	Current Market	1938 Low	1938 High	1937 Low	1937 High
Chromium, Acetate, 8%					
Chrome, bbls ..... lb.	.05	.08	.05	.08	.05	.08
Fluoride, powd, 400 lb bbl					
..... lb.	.27	.28	.27	.28	.27	.28
Coal tar, bbls ..... bbl.	7.50	8.00	7.50	8.00	6.75	9.00
Cobalt Acetate, bbls ..... lb.	.66	.68	.66	.68	.58	.68
Carbonate tech, bbls .... lb.	...	1.63	...	1.63	1.42¾	1.63
Hydrate, bbls ..... lb.	...	1.36	...	1.36	...	...
Linoleate, solid, bbls ... lb.	...	.33	...	.33	.31	.33
paste, 6%, drs ..... lb.	...	.31	...	.31	...	.31
Oxide, black, bgs ..... lb.	...	1.67	...	1.67	1.41	1.67
Resinate, fused, bbls .... lb.	...	.13½	...	.13½	.13	.13¼
Precipitated, bbls .... lb.	...	.34	...	.34	.30½	.34
Cochineal, gray or bk bgs .. lb.	.35	.38	.35	.38	.32	.38
Teneriffe silver, bgs .. lb.	.36	.39	.36	.39	...	.39
Copper, metal, electrol 100 lb.	...	10.25	9.00	11.00	11.00	16.25
Acetate, normal, bbls,						
wks ..... lb.	.21	.23	.21	.23	...	...
Carbonate, 400 lb bbls .. lb.	.10½	.11½	.10¼	.11½	.10½	.12½
52-54% bbls ..... lb.	.14	.15	.1340	.16¾	.15¾	.19
Chloride, 250 lb bbls ... lb.	.12½	.13½	.12½	.17	.15	.18
Cyanide, 100 lb drs ..... lb.	...	.34	.34	.38	.37	.38
Oleate, precip, bbls ... lb.	...	.20	...	.20	...	.20
Oxide, black, bbls, wks.. lb.	.14¾	.15¼	.13½	.17½	.17	.18
red 100 lb bbls ..... lb.	.15¼	.16¼	.15	.19775	.17	.19975
Resinate, precip, bbls lb.	.15	.16	.15	.16	.15	.19
Stearate, precip, bbls lb.	.23	.24	.23	.24	.23	.40
Sub-acetate verdigris, 400						
lb bbls ..... lb.	.18	.19	.18	.19	.18	.19
Sulfate, bbls, c-l, wks 100 lb.	...	4.25	4.00	4.25	4.25	4.50
Copperas, crys and sugar bulk						
c-l, wks ..... ton	12.00	13.00	12.00	13.00	12.00	13.00
Corn Sugar, tanners, bbls 100 lb.	3.15	3.25	3.10	3.30	3.15	4.34
Corn Syrup, 42°, bbls.. 100 lb.	...	3.09	3.04	3.16	3.11	4.36
43°, bbls ..... 100 lb.	...	3.14	3.09	3.21	3.16	4.41
Cotton, Soluble, wet, 100 lb						
bbls ..... lb.	.40	.42	.40	.42	.40	.42
Cream Tartar, powd & gran,						
300 lb bbls ..... lb.	.22¾	.23¼	.19¾	.23¼	.15	.20¼
Creosote, USP, 42 lb cbys lb.	.45	.47	.45	.47	.45	.47
Oil, Grade 1, tks ..... gal.	.13½	.14	.13½	.14	.13	.14
Grade 2 ..... gal.	.122	.132	.122	.132	.113	.132
Cresol, USP, drs ..... lb.	.10½	.11	.10½	.12½	.10	.13
Crotonaldehyde, 97%, 55 and						
110 gal drs, delv ..... lb.	...	.22	.22	.30	.26	.30
Cutch, Philippine, 100 lb bale lb.	.05¼	.06	.04	.06	.04	.04¾
Cyanamid, bgs, c-l, frt allowed						
Ammonia ..... unit	...	1.15	...	1.15	1.10	1.15
Derris root 5% rotenone,						
bbls ..... lb.	.34	.38	.34	.43	.39	.47
Dextrin, corn, 140 lb bgs						
f.o.b., Chicago .... 100 lb.	3.50	3.70	3.45	3.75	3.50	5.00
British Gum, bgs ... 100 lb.	3.75	3.95	3.70	4.00	3.75	5.25
Potato, Yellow, 220 lb bgs lb.	.07¼	.08¾	.07¼	.08¾	.07¾	.08¾
White, 220 lb bgs, lcl .. lb.	.08	.09	.08	.09	.08	.09
Tapioca, 200 bgs, lcl .... lb.	...	.0715	.0715	.08	...	.08
White, 140 lb bgs ... 100 lb.	3.45	3.65	3.45	3.70	4.00	4.58
Diamylamine, c-l, drs, wks lb.	.47	.75	.47	.75	.47	.75
Diamylene, drs, wks ..... lb.	.095	.102	.095	.102	.095	.102
tks, wks ..... lb.	...	.08½	...	.08½	...	.08½
Diamylether, wks, drs .... lb.	.085	.092	.085	.092	.085	.092
tks, wks ..... lb.	...	.075	...	.075	...	.075
Oxalate, lcl, drs, wks ... lb.	...	.30	...	.30	...	.30
Diamylphthalate, drs, wks lb.	.20½	.21	.20½	.21	.19	.21½
Diamyl Sulfide, drs, wks .. lb.	...	1.10	...	1.10	...	1.10
Diatomaceous Earth, see Kieselguhr.						
Dibutoxy Ethyl Phthalate,						
drs, wks ..... lb.	...	.35	...	.35	...	.35
Dibutylamine, lcl, drs, wks lb.	...	.55	...	.55	...	...
Dibutyl Ether, drs, wks, lcl lb.	...	.30	...	.30	...	.30
Dibutylphthalate, drs, wks,						
frt all'd ..... lb.	...	.21	...	.21	.19½	.21
Dibutyltartrate, 50 gal drs lb.	.45	.54	.45	.54	.35	.50
Dichlorethylene, drs ..... lb.	...	.25	...	.25	.25	.29
Dichloroethylether, 50 gal drs,						
wks ..... lb.	.15	.16	.15	.16	.15	.16
tks, wks ..... lb.	...	.14	...	.14	...	.14
Dichloromethane, drs, wks lb.	...	.23	...	.23	...	.23
Dichloropentanes, drs, wks lb.	no prices		...	...	...	...
tks, wks ..... lb.	no prices		...	...	...	...
Diethanolamine, tks, wks .. lb.	...	.23	...	.23	.23	.25
Diethylamine, 400 lb drs .. lb.	2.75	3.00	2.75	3.00	2.75	3.00
Diethylaniline, 850 lb drs.. lb.	.40	.52	.40	.50	.40	.50
Diethyl Carbinol, drs ..... lb.	.60	.75	.60	.75	.60	.75
Diethylcarbonate, com drs.. lb.	.31¼	.35	.31¼	.35	.31¼	.35
Diethylorthotoluidin, drs .. lb.	.64	.67	.64	.67	.64	.67
Diethylphthalate, 1000 lb drs lb.	.19	.19½	.19	.19½	.18	.19½
Diethylsulfate, tech, drs, wks,						
lcl ..... lb.	.13	.14	.13	.14	.13	.20
Diethyleneglycol, drs ..... lb.	.16	.17	.16	.17	.16	.23
Mono ethyl ethers, drs .. lb.	.15	.16	.15	.16	.15	.17
tks, wks ..... lb.	...	.14	...	.14	.14	.15
Mono butyl ether, drs .. lb.	.23	.24	.23	.24	.23	.26
tks, wks ..... lb.	...	.22	...	.22	...	...
Diethylene oxide, 50 gal drs,						
wks ..... lb.	.20	.24	.20	.24	.20	.24
Diglycol Oleate, bbls ..... lb.	...	.21	...	.21	.21	.24
Laurate, bbls ..... lb.	...	.27½	...	.27½	...	...
Stearate, bbls ..... lb.	...	.27½	...	.27½	...	...
Dimethylamine, 400 lb drs,						
pure 25 & 40% sol 100%						
basis ..... lb.	...	1.00	...	1.00	...	.95
Dimethylaniline, 340 lb drs lb.	.26	.27	.26	.27	.26	.27
Dimethyl Ethyl Carbinol, drs lb.	.60	.75	.60	.75	.60	.75
Dimethyl phthalate, drs, wks,						
frt allowed ..... lb.	...	.19	...	.19	.20½	.21
Dimethylsulfate, 100 lb drs lb.	.45	.50	.45	.50	.45	.50
Dinitrobenzene, 400 lb bbls lb. *k*	.16	.19	.16	.19	.16	.19

k Higher price is for purified material.

Current

Dinitrochlorobenzene
Glauber's Salt

		Current Market		1938 Low	1938 High	1937 Low	1937 High
Dinitrochlorobenzene, 400 lb bbls	lb.	.13½	.14	.13½	.14	.14	.17½
Dinitronaphthalene, 350 lb bbls	lb.	.35	.38	.35	.38	.35	.38
Dinitrophenol, 350 lb bbls	lb.	.23	.24	.23	.24	.23	.24
Dinitrotoluene, 300 lb bbls	lb.	...	.15½	...	.15½	.14½	.15½
Diphenyl, bbls	lb.	.15	.25	.15	.25	.15	.25
Diphenylamine	lb.	.31	.32	.31	.32	.31	.32
Diphenylguanidine, 100 lb drs	lb.	.35	.37	.35	.37	.35	.37
Dip Oil, see Tar Acid Oil.							
Divi Divi pods, bgs shipmt	ton	. .	nom.	...	nom.	34.00	nom.
Extract	lb.	.05¾	.06¾	.05	.06¾	.05	.05½
EGG YOLK							
Egg Yolk, dom., 200 lb cases	lb.	.62	.64	.60	.68	.68	nom.
Imported	lb.	.62	.65	.62	.68	.53	.65
Epsom Salt, tech, 300 lb bbls							
c-l, NY	100 lb.	1.90	2.10	1.90	2.10	1.80	2.10
USP, c-l, bbls	100 lb.	...	2.10	...	2.10	2.00	2.10
Ether, USP anaesthesia 55 lb drs	lb.	.22	.23	.22	.23	.22	.23
(Conc)	lb.	.09	.10	.09	.10	.09	.10
Isopropyl 50 gal drs	lb.	.07	.08	.07	.08	.07	.08
tks, frt allowed	lb.	...	.06	...	.06	...	.06
Nitrous, conc, bottles	lb.	...	.68	...	.68	.68	.77
Synthetic, wks, drs	lb.	.08	.09	.08	.09	.08	.09
Ethyl Acetate, 85% Ester							
tks, frt all'd	lb.	...	.05½	...	.05½	.05½	.06½
drs, frt all'd	lb.	...	.06½	...	.06½	.06½	.07½
95%, tks, frt allowed	lb.	...	.06¾	...	.06¾	...	.06¾
drs, frt all'd	lb.	...	.07¾	...	.07¾	...	.07¾
Acetoacetate, 110 gal drs	lb.	...	.27½	...	.27½	...	.27½
Benzylaniline, 300 lb drs	lb.	.86	.88	.86	.88	.86	.88
Bromide, tech, drs	lb.	.50	.55	.50	.55	.50	.55
Cellulose, drs, wks, frt all'd	lb.	.6440	.9440	.6440	1.00	...	...
Chloride, 200 lb drs	lb.	.22	.24	.22	.24	.22	.24
Chlorocarbonate, cbys	lb.	...	.30	...	.30	...	.30
Crotonate, drs	lb.	1.00	1.25	1.00	1.25	1.00	1.25
Formate, drs, frt all'd	lb.	.27	.28	.27	.28	.27	.31
Lactate, drs, wks	lb.	...	.33	...	.33	...	.33
Oxalate, drs, wks	lb.	.30	.34	.30	.34	.30	.34
Oxybutyrate, 50 gal drs, wks	lb.	.30	.30½	.30	.30½	.30	.30½
Silicate, drs, wks	lb.	...	.77	...	.77	...	.77
Ethylene Dibromide, 60 lb drs	lb.	.65	.70	.65	.70	.65	.70
Chlorhydrin, 40%, 10 gal cbys chloro, cont	lb.	.75	.85	.75	.85	.75	.85
Anhydrous	lb.	...	.75	...	.75	...	.75
Dichloride, 50 gal drs, wks	lb.	.0545	.0994	.0545	.0994	.0545	.0994
Glycol, 50 gal drs, wks	lb.	.17	.21	.17	.21	.17	.21
tks, wks	lb.	...	.16	...	.16	...	.16
Mono Butyl Ether, drs, wks	lb.	.20	.21	.20	.21	.20	.21
tks, wks	lb.	...	.19	...	.19	...	.19
Mono Ethyl Ether, drs, wks	lb.	.16	.17	.16	.17	.16	.17
tks, wks	lb.	...	.15	...	.15	...	.15
Mono Ethyl Ether Acetate, drs, wks	lb.	...	.14	...	.14	...	.14
tks, wks	lb.	...	.13	...	.13	...	13
Mono, Methyl Ether, drs wks	lb.	.18	.22	.18	.22	.18	.22
tks, wks	lb.	...	.17	...	.17	...	.17
Oxide, cyl	lb.	.50	.55	.50	.55	.50	.55
Ethylidenaniline	lb.	.45	.47½	.45	.47½	.45	.47½
Feldspar, blk pottery	ton	17.00	19.00	17.00	19.00	...	14.50
Powd, blk, wks	ton	14.00	14.50	14.00	14.50	14.00	14.50
Ferric Chloride, tech, crys, 475 lb bbls	lb.	.05	.07½	.05	.07½	.05	.07½
sol, 42° cbys	lb.	.06¼	.06½	.06¼	.06½	.06¼	.06½
Fish Scrap, dried, unground, wks	unit *l*	...	3.25	2.75	3.25	...	...
Acid, Bulk, 6 & 3%, delv Norfolk & Baltimore basis	unit *m*	...	2.75	2.50	2.50	2.75	3.15
Fluorspar, 98%, bgs	lb.	...	33.00	...	33.00	no prices	
Formaldehyde, USP, 400 lb bbls, wks	lb.	.05¾	.06¼	.05¾	.06¼	.05¾	.06¼
Fossil Flour	lb.	.02½	.04	.02½	.04	.02¼	.04
Fullers Earth, blk, mines	ton	10.00	11.00	10.00	11.00	6.50	15.00
Imo powd, c-l, bgs	ton	23.00	30.00	23.00	30.00	23.00	30.00
Furfural (tech) drs, wks	lb.	.10	.15	.10	.15	.10	.15
Furfuramide (tech) 100 lb drs	lb.	...	.30	...	.30	...	.30
Fusel Oil, 10% impurities	lb.	.12½	.14	.12½	.14	.12½	.18
Fustic, crystals, 100 lb boxes	lb.	.22	.26	.22	.26	.20	.26
Liquid 50*, 600 lb bbls	lb.	.09½	.13	.09½	.13	.08½	.13
Solid, 50 lb boxes	lb.	.17½	.19½	.17½	.19½	.16	.19½
G SALT PASTE							
G Salt paste, 360 lb bbls	lb.	.45	.47	.45	.47	.45	.47
Gall Extract	lb.	.19	.20	.19	.20	.19	.20
Gambier, com 200 lb bgs	lb.	.06¾	.07¾	.06¾	.07¾	...	nom.
Singapore cubes, 150 lb bgs	100 lb.	.10½	.11	.10½	.11	.09½	.10½
Gelatin, tech, 100 lb cs	lb.	.45	.50	.45	.50	.45	.55
Glauber's Salt, tech, c-l, bgs, wks*	100 lb.	.95	1.15	.95	1.15	.95	1.15
Anhydrous, see Sodium Sulfate.							

l + 10; *m* + 50; ***Bbls. are 20c higher.**

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		Current Market	1938 Low	1938 High	1937 Low	1937 High
Glue, bone, com grades, c-l bgs	lb.	.13	.16½	.13	.16½	.11	.17½
Better grades, c-l, bgs	lb.	.14½	.16½	.14½	.16½	.12½	.17½
Casein, kgs	lb.	.18	.22	.18	.22	.18	.22
Glycerin, CP, 550 lb drs	lb.	...	.14¼	.14¼	.16	.15½	.29
Dynamite, 100 lb drs	lb.	.12¾	.13¼	.12¾	.16	.15½	.29
Saponification, drs	lb.	.09½	.09¾	.09½	.11¼	.11	.29
Soap Lye, drs	lb.	.08½	.08¾	.08½	.10¼	.10	.27
Glyceryl Bori-Borate, bbls	lb.	...	.40	...	.40	...	...
Monoricinoleate, bbls	lb.	...	.27	...	.27	...	...
Monostearate, bbls	lb.	...	.30	...	.30	...	...
Oleate, bbls	lb.	...	.22	...	.22	...	...
Phthalate	lb.	...	.37	...	.37	.29	.37
Glyceryl Stearate, bbls	lb.	...	.18	...	.18	...	.18
Glycol Bori-Borate, bbls	lb.	...	.26	...	.26	...	...
Phthalate, drs	lb.	...	.40	...	.40	.29	.40
Stearate, drs	lb.	...	.27½	...	.27½	.23	.27½
GUMS							
Gum Aloes, Barbadoes	lb.	.85	.90	.85	.90	.85	.90
Arabic, amber sorts	lb.	.09¼	.09½	.09¼	.12	.10½	.15½
White sorts, No. 1, bgs	lb.	.23	.24	.23	.28	.24	.30
No. 2, bgs	lb.	.21	.22	.21	.26	.22	.28
Powd, bbls	lb.	.12	.12½	.12	.16	.14	.19
Asphaltum, Barbadoes (Manjak) 200 lb bgs, f.o.b., NY	lb.	02¼	.10½	.02½	.10½	.02¼	.10½
California, f.o.b., NY, drs	ton	29.00	55.00	29.00	55.00	29.00	55.00
Egyptian, 200 lb cases, f.o.b., NY	lb.	.12	.15	.12	.15	.12	.15
Benzoin Sumatra, USP, 120 lb cases	lb.	.23	.25	.15	.25	.15	.25
Copal, Congo, 112 lb bgs, clean, opaque	lb.	...	.18¾	.18¾	.19¼	.18⅞	.19¼
Dark amber	lb.	...	.07½	.07½	.08⅞	.06⅞	.09¼
Light amber	lb.	...	.11⅞	.11⅞	.13¼	.10¼	.14⅜
Copal, East India, 180 lb bgs							
Macassar pale bold	lb.	...	.12⅛	.12⅛	.13	...	.13
Chips	lb.	...	.05⅜	...	.05⅜	.05⅜	.06½
Dust	lb.	.03¼	.04	.03½	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	.10	.10⅜	.10⅜	.11¼
Singapore, Bold	lb.	...	.14½	.14½	.15¼	.15¼	.15⅝
Chips	lb.	...	.04¾	...	.04¼	.04¼	.05
Dust	lb.	.03¼	.04	.03¼	.04⅛	.03⅝	.04⅛
Nubs	lb.	...	.10	...	.10	.10	.10¾
Copal Manilla, 180-190 lb baskets, Loba A	lb	...	.12	...	.12	.09¾	.12
Loba B	lb.	...	.11	.11	.11⅝	.09¼	.11⅝
Loba C	lb.	...	.10⅛	.10⅛	.11¼	.08⅞	.11¼
DBB	lb.	...	.08	.08	.08¾	.08	.08¾
Dust	lb.	...	.05⅞	.05⅞	.06⅝	.05¾	.06⅝
MA sorts	lb.	...	.06⅛	.05⅞	.07¼	.06¾	.07¼
Copal Pontianak, 224 lb cases, bold genuine	lb.	...	.16½	...	.16½	.15½	.16½
Chips	lb.	...	.09⅜	.09⅜	.10¼	.09⅛	.11⅛
Mixed	lb.	...	.14	...	.14	.13½	.14
Nubs	lb.	...	.12¼	.12¼	.12⅞	.12¾	.13½
Split	lb.	...	.13⅜	...	.13⅜	.13½	.15¼
Dammar Batavia, 136 lb cases							
A	lb.	...	.21¾	.21¾	.25½	.23½	.25½
B	lb.	...	.20¼	.20¼	.24	.22⅛	.24
C	lb.	...	.16⅝	.16⅝	.20⅜	.18½	.20⅜
D	lb.	...	.13¾	.13¾	.17½	.15¼	.17½
A/D	lb.	...	.16⅝	.16⅝	.20⅜	.17⅝	.20⅜
A/E	lb.	...	.13⅝	.13⅝	.17¼	.14⅞	.17¼
E	lb.	...	.07⅜	.07⅜	.08½	.07½	.08½
F	lb.	...	.07¼	...	.07¼	.06¼	.07¼
Singapore, No. 1	lb.	...	.17	.17	.21⅛	.17⅛	.21½
No. 2	lb.	...	.11¼	.11¼	.15⅜	.14⅛	.16¼
No. 3	lb.	...	.05½	.05½	.05¾	...	.05¾
Chips	lb.	...	.11⅝	.11⅝	.13½	.10¼	.13¼
Dust	lb.	...	.05¼	.05¼	.05¾	.05¾	.06
Seeds	lb.	...	.08¼	.08¼	.09½	.07⅛	.09½
Elemi, cns., c.l.	lb.	...	.08⅛	.08⅛	.09½	.09⅜	.10¼
Ester	lb.	.06¾	.07½	.06¾	.08½	.09	.12
Gamboge, pipe, cases	lb.	.65	.70	.65	.80	.58	.80
Powd, bbls	lb.	.70	.75	.70	.85	.65	.85
Ghatti, sol. bgs	lb.	.11	.15	.11	.15	.11	.15
Karaya, bbls., bxs., drs.,	lb.	.14½	.23	...	...	...	...
Kauri, NY, Brown XXX, cases	lb.	.60	.60½	.60	.60½	.60	.60½
BX	lb.	...	.38	...	.38	.33	.38
B1	lb.	...	.28	...	.28	.21	.28
B2	lb.	...	.24	...	.24	.15½	.26
B3	lb.	...	.18½	...	.18¼	.12	.18½
Pale XXX	lb.	...	.61	...	.61	.61	.65½
No. 1	lb.	...	.41	...	.41	.40	.41
No. 2	lb.	...	.24	...	.24	.22	.24
No. 3	lb.	...	.17¾	...	.17¾	.15	.17¾
Kino, tins	lb.	2.50	2.75	2.00	2.75	.70	2.10
Mastic	lb.	.55	.56	.55	.56	.55	.58
Sandarac, prime quality, 200 lb bgs & 300 lb cks	lb.	.25	.26	.24	.26	.25	.35
Senegal, picked bags	lb.	.25	.27	.23	.27	.20	.29
Sorts	lb.	.09¼	.09½	.09¼	.12	.09¾	.15
Thus, bbls	280 lbs.	14.00	14.25	13.50	14.25	12.00	14.00
Strained	280 lbs.	14.00	14.25	...	14.25	12.00	14.00
Tragacanth, No. 1, cases	lb.	2.65	2.70	2.65	3.00	2.40	3.25
No. 2	lb.	2.35	2.40	2.35	2.75	2.00	2.75
No. 3	lb.	2.30	2.35	2.30	2.70	1.95	2.70
No. 4	lb.	2.25	2.30	2.25	2.65	1.85	2.65
No. 5	lb.	2.20	2.25	2.20	2.50	1.65	2.50
Yacca, bgs	lb.	.03½	.04½	.03½	.04½	.03¼	.04½
Helium, cyl (200 cu. ft.)	cyl.	...	25.00	...	25.00	...	25.00
Hematine crystals, 400 lb bbls	lb.	.18	.34	.18	.34	.16	.34
Hemlock, 25%, 600 lb bbls, wks	lb.	.03	.03¼	.03	.03¼	.03	.03½
tks	lb.	...	.02¾	...	.02¾	...	.02¾

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Hexalene, 50 gal drs, wks	lb.	.30	...	.30	...	.30
Hexane, normal 60-70° C. Group 3, tks	gal.	.10½	...	.10½	...	.10½
Hexamethylenetetramine, powd, drs	lb.	.36	.35	.36	.35	.36
Hexyl Acetate, secondary, delv, drs	lb.	.13½	.13	.13½	.13	.13½
tks	lb.	.12	...	.12	...	.12
Hoof Meal, f.o.b. Chicago unit		2.50	2.35	3.35	3.20	3.75
Hydrogen Peroxide, 100 vol, 140 lb cbys	lb.	.19½	.19½	.20	.20	.21
Hydroxylamine Hydrochloride	lb.	3.15	...	3.15	...	3.15
Hypernic, 51°, 600 lb bbls	lb.	.21	.16	.21	.15	.21
INDIGO						
Indigo, Bengal, bbls	lb.	2.40	...	2.40	...	2.40
Synthetic, liquid	lb.	.19	.16½	.19	.16½	.19
Iodine, Resublimed, jars	lb.	1.75	1.50	1.75	1.50	1.60
Irish Moss, ord, bales	lb.	.11	.10	.11	.11	.12
Bleached, prime, bales	lb.	.20	.19	.20	.19	.21
Iron Acetate Liq. 17°, bbls, delv	lb.	.04	.03	.04	.03	.04
Chloride see Ferric Chloride,						
Nitrate, coml, bbls 100 lb.		3.11	2.32	3.11	2.32	3.25
Isobutyl Carbinol (128-132° C) drs, wks	lb.	.34	.33	.34	.33	.34
tks, wks	lb.	.32	...	.32	...	.32
Isopropyl Acetate, tks, frt all'd	lb.	.05½	...	.05½	.05½	.06½
drs, frt all'd	lb.	.07	.06½	.07	.06½	.08
Ether, see Ether, isopropyl.						
Keiselguhr, dom bags, c-l, Pacific Coast	ton	85.00	22.00	85.00	22.00	85.00
LEAD ACETATE						
Lead Acetate, f.o.b. NY, bbls, White, broken	lb.	.10	.10	.11	.11	.13½
cryst, bbls	lb.	.10	.10	.11	.11	.13½
gran, bbls	lb.	.10¾	.10¾	.11¾	.11¾	.14¼
powd, bbls	lb.	.10¾	.10¾	.11¾	.11¾	.14¼
Arsenate, East, drs	lb.	.13	.12½	.13½	.11	.13½
Linoleate, solid, bbls	lb.	.19	...	.19	.18	.19
Metal, c-l, NY	100 lb.	4.95	4.00	4.95	4.75	7.05
Nitrate, 500 lb bbls, wks	lb.	.11½	.10	.11½	.09	.11¼
Oleate, bbls	lb.	.20	.18½	.20	.15	.20
Red, dry, 95% Pb_3O_4, delv	lb.	.074	.06½	.074	.07¼	.0945
97% Pb_3O_4, delv	lb.	.0765	.06¾	.0765	.07½	.09¾
98% Pb_3O_4, delv	lb.	.079	.07	.0790	.07¾	.10
Resinate, precip, bbls	lb.	.16½	...	.16½	.14	.16½
Stearate, bbls	lb.	.23	.22	.23	.22	.23
Titanate, bbls, c-l, f.o.b. wks, frt all'd	lb.	.11½	.11	.11½	.10	.12
White, 500 lb bbls, wks	lb.	.06¾	.06	.06¾	.06¾	.09
Basic sulfate, 500 lb bbls, wks	lb.	.06	.05¼	.06¼	.06¼	.08¾
Lime, chemical quicklime, f.o.b., wks, bulk	ton	8.00	7.00	8.00	6.00	8.00
Hydrated, f.o.b., wks	ton	12.00	8.50	12.00	8.00	12.00
Lime Salts, see Calcium Salts.						
Lime sulfur, dealers, tks	gal.	.11½	.08	.11½	...	.11
drs	gal.	.16	.11	.16	.13	.16
Linseed Meal, bgs	ton	43.50	39.00	45.00	35.00	42.50
Litharge, coml, delv, bbls	lb.	.064	.05½	.064	.06¼	.08½
Lithopone, dom, ordinary, delv, bgs	lb.	.04⅝	.04⅛	.04⅝	.04¼	.04⅝
bbls	lb.	.04⅜	.04⅜	.04⅞	.04½	.04⅞
High strength, bgs	lb.	.05⅝	.05⅜	.06⅛	.05¾	.06⅛
bbls	lb.	.05⅞	.05⅞	.06⅜	.06	.06⅜
Titanated, bgs	lb.	.05⅝	.05⅝	.06⅛	.05¾	.06⅛
bbls	lb.	.05⅞	.05⅞	.06⅜	.06	.06⅜
Logwood, 51°, 600 lb bbls	lb.	.11½	.09½	.11½	.08½	.11½
Solid, 50 lb boxes	lb.	.19	.15	.19	.15	.17½
Sticks	ton	25.00	24.00	25.00	24.00	25.00
MADDER						
Madder, Dutch	lb.	.25	.22	.25	.22	.25
Magnesite, calc, 500 lb bbl	ton	65.00	60.00	65.00	60.00	65.00
Magnesium Carb, tech, 70 lb bgs, wks	lb.	.06½	.05¾	.07	.06	.07
Chloride flake, 375 lb drs, c-l, wks	ton	42.00	39.00	42.00	39.00	42.00
Fluosilicate, crys, 400 lb bbls, wks	lb.	.10½	.10	.10½	.10	.10½
Oxide, calc tech. heavy bbls, frt all'd	lb.	.30	.25½	.30½	...	...
Light, bbls, above basis	lb.	.25	.20	.25½	...	...
USP Heavy, bbls, above basis	lb.	.30	.25	.30½	...	...
Palmitate, bbls	lb.	nom.	...	.33	.33	nom.
Silicofluoride, bbls	lb.	.10½	.09½	.10½	.09½	.10½
Stearate, bbls	lb.	.24	.21	.24	.21	.24
Manganese acetate, drs	lb.	.26½	...	.26½	.25½	.26½
Borate, 30%, 200 lb bbls	lb.	.16	.15	.16	.15	.16
Chloride, 600 lb cks	lb.	.12	.09	.12	.09	.12
Dioxide, tech (peroxide), paper bgs, c-l	ton	57.50	57.50	62.50	47.50	62.50
Hydrate, bbls	lb.	.32	...	.32	...	.32
Linoleate, liq, drs	lb.	.19¼	.18	.19¼	.18	.19¼
solid, precip, bbls	lb.	.19	...	.19	.17½	.19
Resinate, fused, bbls	lb.	.08¾	.08¼	.08¾	.08¼	.08¾
precip, drs	lb.	.12	...	.12	...	.12
Sulfate, tech, anhyd, 90-95%, 550 lb drs	lb.	.07½	.07	.07½	.07	.07½

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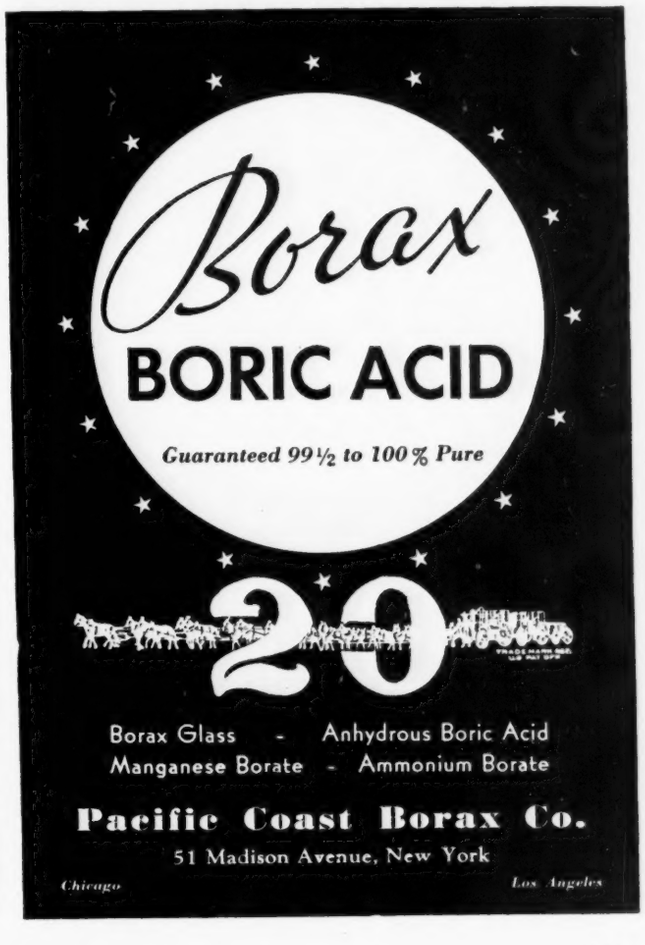

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Prices

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Mangrove, 55%, 400 lb bbls lb.	...	.04		.04	...	.04
Bark, African ..... ton	...	24.50	24.50	25.50	25.00	27.00
Mannitol, pure cryst, cs, wks lb.	...	1.30	1.30	1.45	1.45	1.48
Marble Flour, blk ..... ton	12.00	13.00	12.00	13.00	12.00	13.00
Mercury chloride (Calomel) lb.	...	1.28	1.18	1.59	1.05	1.60
Mercury metal ...76 lb. flasks	76.50	84.50	76.50	84.50	81.00	99.00
Meta-nitro-aniline ..... lb.	.67	.69	.67	.69	.67	.69
Meta-nitro-paratoluidine 200 lb bbls ..... lb.	1.45	1.55	1.45	1.55	1.45	1.55
Meta-phenylene diamine 300 lb bbls ..... lb.	.80	.84	.80	.84	.80	.84
Meta-toluene-diamine, 300 lb bbls ..... lb.	.65	.67	.65	.67	.65	.67
Methanol, denat, grd, drs, c-l, frt all'd ..... gal.	...	.31	.31	.36	.36	.53
tks, frt all'd ..... gal.	...	.25	.25	.30	.30	.48
Pure, drs, c-l, frt all'd gal.	...	.38	...	.38	...	.38
tks ..... gal.	...	.33	...	.33	...	.33
95%, tks ..... gal.	...	.31	...	.31	...	.31
97%, tks ..... gal.	...	.32	...	.32	..	.32
Methyl Acetate, tech, tks, delv ..... lb.	...	.06½	...	.06½	...	...
55 gal drs, delv ..... lb.	.07½	.08	.07½	.08	...	...
C.P. 97-99%, tks, delv lb.	...	.07	...	.07	...	...
55 gal drs, delv ..... lb.	.08	.08½	.08	.08½	...	...
Acetone, frt all'd, drs gal. *p*	.30	.36	.30	.40½	.34½	.58½
tks, frt all'd, drs ..gal. *p*	.25	.29	.25	.32½	.28½	.44½
Synthetic, frt all'd, east of Rocky M., drs ..... gal. *p*	.42	.51	.42	.51	.42	.59½
tks, frt all'd ..gal.	.36	.39½	.36	.39½	.36	.49½
West of Rocky M., frt all'd, drs ..gal. *p*	...	.46	...	.46	.46	.58
tks, frt all'd ..gal. *p*	...	.39½	...	.39½	.39½	.51
Anthraquinone ..... lb.	.65	.67	.65	.67	.65	.67
Butyl Ketone, tks ..... lb.	...	.10½	...	.10½	...	.10½
Chloride, 90 lb cyl ..... lb.	.32	.40	.32	.40	.32	.43
Ethyl Ketone, tks, frt all'd lb.	...	.05½	.05½	.06	...	.07½
50 gal drs, frt all'd c-l ..lb.	...	.06½	.06½	.07	...	...
Formate, drs, frt all'd ..lb.	.35	.36	.35	.36	.35	.39
Hexyl Ketone, pure, drs lb.	...	.60	...	.60	...	.60
Lactate, drs, frt all'd ...lb.	...	.30	...	.30	...	.30
Propyl carbinol, drs ....lb.	.60	.75	.60	.75	.60	.75
Mica, dry grd, bgs, wks ...lb.	...	35.00	...	35.00	...	35.00
Michler's Ketone, kgs ....lb.	...	2.50	...	2.50	...	2.50
Molasses, blacksrap, tks, f.o.b. NY ..... gal.	...	.07	...	.07	.07	.07¼
Monoamylamine, c-l, drs, wks lb.	.52	1.00	.52	1.00	.52	1.00
Monobutylamine, lcl, drs, wks ..... lb.	...	.65	...	.65	...	...
Monochlorobenzene, see Chlorobenzene, mono.						
Monoethanolamine, tks, wks lb.	...	.23	...	.23	.25	.30
Monomethylamine, drs, frt all'd, E. Mississippi, c-l lb.	...	.65	...	.65	...	.65
Monomethylparaminosulfate, 100 lb drs ..... lb.	3.75	4.00	3.75	4.00	3.75	4.00
Myrobalans 25%, liq bbls. lb.	.03¾	.04¼	.03¾	.04¼	...	.04¼
50% Solid, 50 lb boxes lb.	.04⅜	.05	.04⅜	.06¼	.06	.06¼
J1 bgs ..... ton	...	27.50	27.00	30.00	26.50	30.00
J2 bgs ..... ton	...	19.50	19.50	22.00	19.00	22.50
R2 bgs ..... ton	...	17.50	17.50	22.00	18.75	22.00
NAPHTHA						
Naphtha, v.m.&p. (deodorized) see petroleum solvents.						
Naphtha, Solvent, water-white, tks ..... gal.	...	.26	.26	.31	...	.31
drs, c-l ..... gal.	...	.31	.31	.36	...	.36
NAPHTHALENE						
Naphthalene, dom, crude, bgs, wks ..... lb.	2.35	2.85	2.35	2.85	2.00	3.00
Imported, cif, bgs ....lb.	1.60	2.15	1.60	2.25	2.20	3.00
Balls, flakes, pks ..... lb.	...	.07½	.07½	.08	...	.08
Balls, ref'd, bbls, wks ..lb.	...	.06¾	.06¾	.07¼	...	.07¼
Flakes, ref'd, bbls, wks. lb.	...	.06¾	.06¾	.07¼	...	.07¼
Nickel Carbonate, bbls ....lb.	.36	.37½	.36	.37½	.36	.37½
Chloride, bbls ..... lb.	.18	.20	.18	.20	.18	.20
Metal ingot ..... lb.	...	.35	...	.35	...	.35
Oxide, 100 lb kgs, NY. lb.	.35	.37	.35	.37	.35	.37
Salt, 400 lb bbls, NY ...lb.	.13	.13½	.13	.13½	.13	.13½
Single, 400 lb bbls, NY lb.	.13	.13½	.13	.13½	.13	.13½
Nicotine, 40%, drs, sulfate, 55 lb drs ..... lb.	...	.76	...	.76	...	.76
Nitre Cake, blk ..... ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, redistilled, 1000 lb drs, wks ..... lb.	.08	.10	.08	.10	.08	.10
tks ..... lb.	...	.07½	...	.07¼	...	.07½
Nitrocellulose, c-l, l-c-l, wks lb.	.22	.29	.22	.29	.26	.29
Nitrogen Sol. 45½% ammon., f.o.b. Atlantic & Gulf ports, tks. unit ton	...	1.00	...	...	...	...
Nitrogenous Mat'l, bgs, imp unit	...	nom.	2.35	2.65	2.55	3.55
dom, Eastern wks .....unit	...	nom.	2.50	2.75	2.50	4.25
dom, Western wks .....unit	...	nom.	2.20	2.35	2.25	3.75
Nitronaphthalene, 550 lb bbls lb.	.24	.25	.24	.25	.24	.25
Nutgalls Alleppo, bgs ..... lb.	no prices		...	...	.20	.22
Chinese, bgs ..... lb.	no prices		...	...	.20	.22
OAK BARK						
Oak Bark Extract, 25%, bbls lb.	...	.03⅛	...	.03⅛	...	.03⅛
tks ..... lb.	...	.02¾	...	.02¾	...	.02¾
Octyl Acetate, tks, wks ...lb.	.16	.17	.16	.17	.16	.17

o Country is divided in 4 zones, prices varying by zone; *p* Country is divided into 4 zones. Also see footnote directly above; *q* Naphthalene quoted on Pacific Coast F.A.S. Phila. or N. Y.

Current

Orange-Mineral Phenylhydrazine Hydrochloride

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Orange-Mineral, 1100 lb cks NY lb.	...	.10¼	.09½	.10¼	.10¼	.12¾
Orthoaminophenol, 50 lb kgs lb.	2.15	2.25	2.15	2.25	2.15	2.25
Orthoanisidine, 100 lb drs lb.	.70	.74	.70	.74	.70	.74
Orthochlorophenol, drs ... lb.	.35	.75	.35	.75	.35	.75
Orthocresol, drs, wks ... lb.	.13½	.14½	.13½	.14½	.13½	.14½
Orthodichlorobenzene, 1000 lb drs ... lb.	.06	.07	.06	.07	.05	.07
Orthonitrochlorobenzene, 1200 lb drs, wks ... lb.	.15	.18	15	.18	.28	.29
Orthonitroparachlorphenol, tins ... lb.	...	.75	...	.75	.70	.75
Orthonitrophenol, 350 lb drs ... lb.	.85	.90	.85	.90	.85	.90
Orthonitrotoluene, 1000 lb drs, wks ... lb.	.08	.10	.08	.10	.07	.10
Orthotoluidine, 350 lb bbls, l-c-l ... lb.	.16	.17	.16	.17	.14	.17
Osage Orange, cryst, bbls .. lb.	.17	.25	.17	.25	.17	.25
51° liquid ... lb.	.07	.08	.07	.08	.07	.08
Paraffin, rfd, 200 lb bgs 122-127° M P ... lb.	.043	.0435	.043	.04½	.0445	.04½
128 132° M P ... lb.	.0445	.0455	.0445	.049	.04¾	.049
133-137° M P ... lb.	.05	.05¼	.05	.05¾	.05½	.05¾
Para aldehyde, 99%, tech, 110-55 gal drs, delv .. lb.	...	.16	.16	.18	.16	.18
Aminoacetanilid, 100 lb kgs ... lb.	...	.85	...	.85	...	.85
Aminohydrochloride, 100 lb kgs ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Aminophenol, 100 lb kgs lb.	...	1.05	...	1.05	...	1.05
Chlorophenol, drs ... lb.	.30	.45	.30	.45	.30	.45
Dichlorobenzene, 200 lb drs, wks ... lb.	.11	.12	.11	.12	.11	.20
Formaldehyde, drs, wks lb.	.34	.35	.34	.35	.34	.35
Nitroacetanilid, 300 lb bbls ... lb.	.45	.52	.45	.52	.45	.52
Nitroaniline, 300 lb bbls, wks ... lb.	.45	.47	.45	.47	.45	.47
Nitrochlorobenzene, 1200 lb drs, wks ... lb.	.15	.16	.15	.16	.23½	.24
Nitro-orthotoluidine, 300 lb bbls ... lb.	2.75	2.85	2.75	2.85	2.75	2.85
Nitrophenol, 185 lb bbls lb.	.35	.37	.35	.37	.35	.37
Nitrosodimethylaniline, 120 lb bbls ... lb.	.92	.94	.92	.94	.92	.94
Nitrotoluene, 350 lb bbls lb.	...	.35	...	.35	...	.35
Phenylenediamine, 350 lb bbls ... lb.	1.25	1.30	1.25	1.30	1.25	1.30
Toluenesulfonamide, 175 lb bbls ... lb.	.70	.75	.70	.75	.70	.75
tks, wks ... lb.	...	.31	...	.31	...	.31
Toluenesulfonchloride, 410 lb bbls, wks ... lb.	.20	.22	.20	.22	.20	.22
Toluidine, 350 lb bbls, wks ... lb.	.56	.58	.56	.58	.56	.58
Paris Green, dealers, drs .. lb.	.23	.26	.23	.26½	.22	.26½
Pentane, normal, 28-38° C, group 3, tks ... gal.	...	.08½	...	.08½	.08½	.09½
drs, group 3 ... gal.	.11½	.16	.11½	.16	.12½	.16
Perchlorethylene, 100 lb drs, frt all'd ... lb.	...	.10½	...	.10½	...	.10½
Petrolatum, dark amber, bbls ... lb.	.02⅝	.02¾	.02⅝	.03⅞	.02⅝	.03
Light, bbls ... lb.	.03⅛	.03⅜	.03⅛	.03⅜	.03⅛	.03¾
Medium, bbls ... lb.	.02⅞	.03⅛	.02⅞	.03⅛	.02⅞	.03⅛
Dark green, bbls ... lb.	.02½	.02¾	.02½	.02¾	.02½	.02¾
Red, bbls ... lb.	.02½	.03⅝	.02½	.03⅝	.02⅛	.03¾
White, lily, bbls ... lb.	.05¼	.07⅛	.05¼	.07⅛	.06	.06¼
White, snow, bbls ... lb.	.06¼	.08⅛	.06¼	.08⅛	.07	.07¼
Petroleum Ether, 30-60°, group 3, tks ... gal.	...	.13	...	.13	...	.13
drs, group 3 ... gal.	.14	.17	.14	.17	.15	.17

PETROLEUM SOLVENTS AND DILUENTS

Cleaners naphthas, group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
East Coast, tks, wks gal.	...	.10	...	.10	.09½	10
Hydrogenated, naphthas, frt all'd East, tks ... gal.	...	.16	...	.16	...	.16
No. 2, tks ... gal.	...	.18	...	.18	...	.18
No. 3, tks ... gal.	...	.16	...	.16	...	.16
No. 4, tks ... gal.	...	.18	...	.18	...	.18
Lacquer diluents, tks, Bayonne ... gal.	12	.12½	.12	.12½	.12	.12½
Group 3, tks ... gal.	.07⅜	.07⅝	.07⅜	.08⅜	.07⅞	.08⅞
Naphtha, V.M.P., East, tks, wks ... gal.		.10	.10	.11	.10	.11
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
Petroleum thinner, 43-47, East, tks, wks gal.	.09	.10	.09	.10	.09	.10
Group 3, tks, wks gal.	...	.05⅜	.05⅜	.06⅜	.05⅞	.06⅞
Rubber Solvents, stand grd, East, tks, wks ... gal.	.09½	.10	.09½	.10	.09½	.10
Group 3, tks, wks ... gal.	.06⅜	.06⅝	.06⅜	.07⅜	.06⅞	.07⅞
Stoddard Solvent, East, tks, wks ... gal.	...	.10	.09½	.10	.09½	.10
Group 3, tks, wks ... gal.	.05⅞	.06⅛	.05⅞	.06⅞	.06⅜	.07⅜
Phenol, 250-100 lb drs .... lb.	.14½	.15½	.14½	.15½	.13¼	.15½
tks, wks ... lb.	...	.13½	...	.13½	.12¼	.13½
Phenyl-Alpha-Naphthylamine, 100 lb kgs ... lb.	...	1.35	...	1.35	...	1.35
Phenyl Chloride, drs ... lb.	...	.17	...	.17	.16	.17
Phenylhydrazine Hydrochloride, com ... lb.	...	1.50	...	1.50	...	1.50

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Neutral, Light or Viscous Oils and Resins; Flame-Resistant

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UNITED STATES POTASH COMPANY
INCORPORATED
30 Rockefeller Plaza
New York, N. Y.

Phloroglucinol
Rosin Oil

Prices

		Current Market	1938 Low	1938 High	1937 Low	1937 High
Phloroglucinol, tech, tins	lb.	15.00	15.00	16.50	15.00	16.50
CP, tins	lb.	20.00	20.00	22.00	20.00	22.00
Phosphate Rock, f.o.b. mines						
Florida Pebble, 68% basis	ton	...	...	1.85	...	1.85
70% basis	ton	...	...	2.35	...	2.35
72% basis	ton	...	...	2.85	...	2.85
75-74% basis	ton	...	...	3.85	...	3.85
75% basis	ton	...	...	5.50	...	5.50
Tennessee, 72% basis	ton	...	...	4.50	...	4.50
Phosphorus Oxychloride 175 lb cyl	lb.	.16	.16	.20	.16	.20
Red, 110 lb cases	lb.	.40	.40	.44	.40	.44
Sesquisulfide, 100 lb cs.	lb.	.38	.38	.44	.38	.44
Trichloride, cyl	lb.	.15	.15	.18	.15	.20
Yellow, 110 lb cs, wks	lb.	.24	.24	.30	.24	.33
Phthalic Anhydride, 100 lb drs, wks	lb.	...	.14½	...	.14½	.14½ .15½
Pine Oil, 55 gal drs or bbls						
Destructive dist	lb.	.52	.52	.55	.49	.65
Steam dist wat wh bbls	gal.	...	...	.59	.59	.79
tks	gal.	...	.54	.54	.54	.74
Pitch Hardwood, wks	ton	18.25	18.25	18.75	15.00	18.75
Coaltar, bbls, wks	ton	...	19.00	19.00	...	19.00
Burgundy, dom, bbls, wks	lb.	.05½	.05½	.06½	.03½	.06½
Imported	lb.	.15	.15	.16	.11	.16
Petroleum, see Asphaltum in Gums' Section.						
Pine, bbls	bbl.	6.00	5.75	6.25	5.75	6.50
Stearin, drs	lb.	.03	.03	.04½	.03	.04½
Platinum, ref'd	oz.	36.00	32.00	38.00	32.00	68.00
POTASH						
Potash, Caustic, wks, sol	lb.	.06¼	.06¼	.06½	.06¼	.06½
flake	lb.	.07	.07	.07½	.07	.07½
Liquid, tks	lb.	...	.02⅞	.02⅞	...	.02⅞
Manure Salts, imported 30% basis, blk	unit	...	.58½	.58½	.55	.58½
Potassium Abietate, bbls	lb.	...	.08	.13	...	.
Acetate, tech, bbls, delv	lb.	...	.26	.28	.26	.28
Bicarbonate, USP, 320 lb bbls	lb.	...	.18	.18	.09	.18
Bichromate Crystals, 725 lb cks*	lb.	.08¾	.09¼	.09¼	.08¾	.09
Binoxalate, 300 lb bbls	lb.	...	.23	.23	...	.23
Bisulfate, 100 lb kgs	lb.	.15½	.15½	.18	.15½	.18
Carbonate, 80-85% calc 800 lb cks	lb.	.06½	.06½	.07	.06½	.07
liquid, tks	lb.	...	.02⅞	.02⅞	.02¼	.02⅞
drs, wks	lb.	.03	.03½	.03½	.02⅞	.03½
Chlorate crys, 112 lb kgs, wks	lb.	.09¼	.09¼	.09¼	.09¼	.09¼ .09½
gran, kgs	lb.	.12	.12	.13	.12	.13
powd, kgs	lb.	.08½	.08¼	.08½	.08¼	.08½ .08¾
Chloride, crys, bbls	lb.	.04	.04¼	.04¼	.04	.04¼
Chromate, kgs	lb.	.19	.28	.19	.28	.28 .29
Cyanide, 110 lb cases	lb.	.50	.55	.50	.57½	.55 .57½
Iodide, 250 lb bbls	lb.	...	1.13	.93	1.13	.93 1.15
Metabisulfite, 300 lb bbls	lb.	.12	.13½	.12	.15	.11 .15
Muriate, bgs, dom, blk unit		...	.53½	...	.53½	.50 .53½
Oxalate, bbls	lb.	.25	.26	.25	.26	.25 .26
Perchlorate, kgs, wks	lb.	.09	.10½	.09	.11½	.09½ .11
Permanganate, USP, crys, 500 & 1000 lb drs, wks	lb.	.18½	.19½	.18½	.19½	.18½ .19½
Prussiate, red, bbls	lb.	.30½	.34	.30½	.37	.35 .37
Yellow, bbls	lb.	.15	.16	.15	.16	.15 .18
Sulfate, 90% basis, bgs	ton	...	38.00	...	38.00	... 36.25
Titanium Oxalate, 200 lb bbls	lb.	.35	.40	.35	.40	.33 .40
Pot & Mag Sulfate, 48% basis bgs	ton	...	25.75	...	25.75	24.75 25.75
Propane, group 3, tks	lb.	.03	.04⅜	.03	.04⅜	.03 .04⅜
Putty, coml, tubs	100 lb.	...	3.00	2.25	3.00	2.90 3.00
Linseed Oil, kgs	100 lb.	...	4.50	4.00	4.65	4.65 4.75
Pyrethrum, conc liq: 2.4% pyrethrins, drs, frt all'd	gal.	6.40	6.75	5.00	6.75	4.15 5.25
3.6% pyrethrins, drs, frt all'd	gal.	9.60	9.95	7.65	9.95	6.10 7.85
Flowers, coarse, Japan, bgs	lb.	...	.23	.18	.23¾	.12¾ .18
Fine powd, bbls	lb.	...	.28	.19	.28	.14 .19
Pyridine, denat, 50 gal drs	gal.	...	1.55	...	1.55	1.30 1.55
Refined, drs	lb.	...	.45	...	.45	... ...
Pyrites, Spanish cif Atlantic ports, blk	unit	.12	.13	.12	.13	.12 .13
Pyrocatechin, CP, drs, tins	lb.	2.15	2.75	2.15	2.75	2.15 2.75
Quebracho, 35% liq tks	lb.	...	.03	...	.03	.02⅞ .03
450 lb bbls, c-l	lb.	...	.03½	...	.03½	.03½ .03⅞
Solid, 63%, 100 lb bales cif	lb.	...	.04	...	.04	.03⅞ .04
Clarified, 64%, bales	lb.	...	.04¼	...	.04¼	.04¼ .04¼
Quercitron, 51 deg liq, 450 lb bbls	lb.	.06	.06½	.06	.06½	.06 .06½
Solid, drs	lb.	.10	.12	.10	.12	.10 .12
R SALT						
R Salt, 250 lb bbls, wks	lb.	.52	.55	.52	.55	.52 .55
Resorcinol tech, cans	lb.	.75	.80	.75	.80	.75 .80
Rochelle Salt, cryst	lb.	.17¾	.18¼	.15	.18¼	.14½ .15½
Powd, bbls	lb.	.16¾	.17¼	.16	.18½	.13½ .16¼
Rosin Oil, bbls, first run	gal.	.45	.47	.45	.60	.52 .73
Second run	gal.	.47	.49	.47	.62	.54 .75
Third run, drs	gal.	.51	.53	.51	.66	.58 .79

* Spot price is ⅛c higher.

Current

Rosins
Sodium Naphthionate

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Rosins 600 lb bbls, 280 lb unit ex. yard NY:†					
B	...	4.90	4.65	6.00	5.50	10.00
D	...	5.25	4.90	6.00	5.50	10.35
E	...	5.65	4.95	6.00	5.75	10.25
F	...	6.15	5.30	7.00	6.87½	10.80
G	...	6.15	5.50	7.05	6.87½	10.85
H	...	6.15	5.55	7.15	6.90	10.85
I	5.60	6.15	5.60	7.15	6.95	10.90
K	...	6.15	5.65	7.25	6.95	10.90
M	5.65	6.20	5.65	7.40	7.05	11.00
N	...	6.90	6.20	7.50	7.10	11.05
WG	...	7.20	6.80	8.45	7.65	11.75
WW	...	7.80	7.70	9.15	8.00	13.75
Rosins, Gum, Savannah (280 lb unit):†						
B	...	3.50	3.25	4.60	4.25	8.75
D	...	3.85	3.50	4.60	4.25	9.00
E	...	4.25	3.55	4.60	4.25	9.10
F	...	4.75	3.90	5.60	5.50	9.55
G	...	4.75	4.10	5.65	5.60	9.60
H	...	4.75	4.20	5.75	5.70	9.60
I	...	4.75	4.20	5.85	5.70	9.65
K	...	4.75	4.20	6.00	5.70	9.65
M	...	4.80	4.20	6.15	5.80	9.75
N	...	5.50	4.80	6.20	5.85	9.75
WG	...	5.80	5.40	7.05	6.40	10.50
WW	...	6.30	6.10	7.75	6.75	12.50
X	...	6.40	6.10	7.75	6.75	12.50
Rosin, Wood, c-l, FF grade, NY	...	5.05	5.05	6.40	6.40	10.72
Rotten Stone, bgs mines ..ton	...	35.00	...	35.00	...	35.00
Imported, lump, bbls ...lb.	...	.12	...	.12	...	...
Powdered, bbls .....lb.	.08½	.10	.08½	.10	...	...

SAGO FLOUR

Sago Flour, 150 lb bgs ...lb.	.02½	.03½	.02½	.03¾	.02¾	.03¾
Sal Soda, bbls, wks ...100 lb.	...	1.20	...	1.20	1.15	1.20
Salt Cake, 94-96%, c-l, wks ton	19.00	23.00	19.00	23.00	19.00	23.00
Chrome, c-l, wks ...ton	11.00	12.00	11.00	12.00	11.00	12.00
Saltpetre, gran, 450-500 lb bbls .....lb.	.06½	.069	.06½	.069	.06	.069
Cryst, bbls .....lb.	.07½	.0865	.07½	.0865	.07	.0865
Powd, bbls .....lb.	.07½	.079	.07½	.079	.07	.079
Satin, White, pulp, 550 lb bbls .....lb.	.01¼	.01½	.01¼	.01½	.01¼	.01½
Schaeffer's Salt, kgs .....lb.	.46	.48	.46	.48	.46	.48
Shellac, Bone dry, bbls..lb. r	.19	.20	.16½	.20	.17	.22
Garnet, bgs .....lb.	.13½	.14	.13½	.15	.14	.17
Superfine, bgs .....lb. s	.11½	.12	.11½	.13½	.13	.18½
T. N., bgs .....lb. s	.11	.11¼	.11	.12½	.12	.14½
Silver Nitrate, vials .....oz.	.31½	.33½	.33½	.34⅞	.32½	.35½
Slate Flour, bgs, wks ....ton	9.00	10.00	9.00	10.00	9.00	10.00
Soda Ash, 58% dense, bgs,						
c-l, wks .....100 lb.	...	1.10	...	1.10	...	1.10
58% light, bgs .....100 lb.	...	1.08	...	1.08	...	1.08
blk .....100 lb.	...	.90	...	.90	...	.90
paper bgs .....100 lb.	...	1.05	...	1.05	...	1.05
bbls .....100 lb.	...	1.35	...	1.35	...	1.35
Caustic, 76% grnd & flake,						
drs .....100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drs .....100 lb.	...	2.30	...	2.30	...	2.30
Liquid sellers, tks ..100 lb.	...	1.97½	...	1.97½	...	1.97½
Sodium Abietate, drs .....lb.	...	.10	.10	.13	.08	.13
Acetate, 60% tech, gran, powd, flake, 450 lb bbls, wks .....lb.	.04	.05	.04	.05	.04¼	.05
anhyd, drs, delv .....lb.	...	.08¼	...	.08¼	...	...
Alginate, drs .....lb.	...	.69	...	.69	.64	.69
Antimoniate, bbls .....lb.	.12	.12½	.12	.15¼	.13¾	.16¼
Arsenate, drs .....lb.	.08	.08½	.08	.08½	.08	.11½
Arsenite, liq, drs .....gal.	.30	.33	.30	.33	.33	.40
Dry, gray, drs, wks ..lb.	.07½	.09½	.07½	.09½	...	...
Benzoate, USP, kgs ..lb.	.46	.48	.46	.48	.46	.48
Bicarb, powd, 400 lb bbl, wks .....100 lb.	...	1.85	...	1.85	1.75	1.85
Bichromate, 500 lb cks, wks* .....lb.	.06¾	.07¼	.06¾	.07¼	.06½	.07¼
Bisulfite, 500 lb bbl, wks lb.	.03¼	.036	.03¼	.036	.03¼	.036
35-40% sol bbls, wks 100 lb.	1.40	1.80	1.40	1.80	...	...
Chlorate, bgs, wks ..lb.	.06¼	.07½	.06¼	.07½	.06¼	.07½
Cyanide, 96-98%, 100 & 250 lb drs, wks .....lb.	.14	.15	.14	.17½	.15½	.17½
Diacetate, 33-35% acid, bbls, lcl, delv .....lb.	...	.09	...	.09	...	...
Fluoride, white 90%, 300 lb bbls, wks .....lb.	.07½	.08¼	.07½	.08¼	.07½	.08¼
Hydrosulfite, 200 lb bbls, f.o.b. wks .....lb.	.16	.17	.16	.17	.16	.17
Hyposulfite, tech, pea crys 375 lb bbls, wks 100 lb.	...	2.80	2.50	2.80	2.50	3.00
Tech, reg cryst, 375 lb bbls, wks .....100 lb.	2.45	2.80	2.40	2.80	2.40	2.75
Iodide, jars .....lb.	...	2.10	1.90	2.10	1.90	1.95
Metal, drs, 280 lbs. .....lb.	...	.19	...	.19	...	.19
Metanilate, 150 lb bbls lb.	.41	.42	.41	.42	.41	.42
Metasilicate, gran, c-l, wks .....100 lb.	...	2.20	2.15	2.20	...	2.15
cryst, bbls, c-l, wks 100 lb.	...	2.90	2.75	2.90	...	2.75
Monohydrate, bbls .....lb.	...	.023		.023	...	.023
Naphthenate, drs .....lb.	.12	.19	.12	.19	.09	.19
Naphthionate, 300 lb bbl lb.	.52	.54	.52	.54	.52	.54

r Bone dry prices at Chicago 1c higher; Boston ½c; Pacific Coast 2c; Philadelphia deliveries f.o.b. N. Y.; refined 6c higher in each case; s T. N. and Superfine prices quoted f.o.b. N. Y. and Boston; Chicago prices 1c higher; Pacific Coast 3c; Philadelphia f.o.b. N. Y. * Spot price is ½c higher; † Closing prices Nov. 26th.

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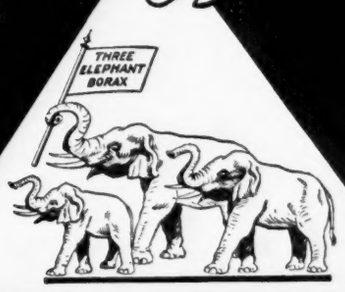

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	Current Market	1938 Low	1938 High	1937 Low	1937 High
Sodium (continued):					
Nitrate, 92%, crude, 200 lb bgs, c-l, NY ton	... 28.30	...	28.30	26.80	28.30
100 lb bgs ton	... 29.00	...	29.00	27.50	29.00
Bulk ton	... 27.00	...	27.00	25.50	27.00
Nitrite, 500 lb bbls lb.	.06¾ .11½	.06¾	.11½	.07	.10
Orthochlorotoluene, sulfonate, 175 lb bbls, wks lb.	.25 .27	.25	.27	.25	.27
Perborate, drs, 400 lbs lb.	.14¾ .15¼	.14¾	.15¼	.14¾	.15¼
Peroxide, bbls, 400 lb lb.	... .17	...	.17	...	.17
Phosphate, di-sodium, tech, 310 lb bbls, wks 100 lb.	... 2.05	...	2.05	1.90	2.05
bgs, wks 100 lb.	... 1.85	...	1.85	1.70	1.85
Tri-sodium, tech, 325 lb bbls, wks 100 lb.	... 2.20	...	2.20	2.05	2.20
bgs, wks 100 lb.	... 2.00	...	2.00	1.85	2.00
Picramate, 160 lb kgs lb.	.65 .67	.65	.67	.65	.67
Prussiate, Yellow, 350 lb bbl. wks lb.	.10 .11½	.10	.11½	.10	.11½
Pyrophosphate, anhyd, 100 lb bbls fob wks frt eq lb.	... .0610	.0610	.10	...	.10
Sesquisilicate, drs, c-l, wks 100 lb.	... 2.80	2.80	3.00	...	...
Silicate, 60°, 55 gal drs, wks 100 lb.	1.65 1.70	1.65	1.70	1.65	1.70
40°, 35 gal drs, wks 100 lb.	... .80	...	.80	...	.80
tks, wks 100 lb.	... .65	...	.65	...	.65
Silicofluoride, 450 lb bbls NY lb.	.05¼ .05½	.05¼	.06½	.05¾	.07
Stannate, 100 lb drs lb.	.29½ .32½	.25½	.32½	.28	.44
Stearate, bbls lb.	... .24	...	.24	.19	.24
Sulfanilate, 400 lb bbls lb.	.16 .18	.16	.18	.16	.18
Sulfate Anhyd, 550 lb bgs• c-l, wks 100 lb. †	1.45 1.90	1.45	1.90	1.45	1.90
Sulfide, 80% cryst, 440 lb bbls, wks lb.	... .02¼	...	.02¼	...	.02¼
Solid, 650 lb drs, c-l, wks lb.	... .03	...	.03	...	.02
Sulfite, cryst, 400 lb bbls, wks lb.	.023 .02½	.023	.02½	.023	.02½
Sulfocyanide, drs lb.	.28 .47	.28	.47	.28	.47
Sulforicinoleate, bbls lb.	... .12	...	.12	...	.12
Tungstate, tech, crys, kgs lb.	... nom.	...	...	.85	.90
Sorbitol, com, solut., wks, c-l drs, wks lb.	... .17	.17	.19	...	.25
Spruce Extract, ord, tks lb.	... .01⅛	...	.01⅛	.01	.01⅛
Ordinary, bbls lb.	... .01⅜	...	.01⅜	.01½	.01⅜
Super spruce ext, tks lb.	... .01⅜	...	.01⅜	.01⅜	.01⅝
Super spruce ext, bbls lb.	... .01⅞	...	.01⅞	...	.01⅞
Super spruce ext, powd, bgs lb.	... .04	...	.04	.04	.04¼
Starch, Pearl, 140 lb bgs 100 lb.	2.60 2.80	2.60	3.18	2.93	4.53
Powd, 140 lb bgs 100 lb.	2.70 2.95	2.70	3.28	3.03	4.63
Potato, 200 lb bgs lb.	.04 .05	.03½	.05½	.04½	.05½
Imp, bgs lb.	.05 .06	.05	.06	.05	.06
Rice, 200 lb bbls lb.	.06¼ .07¼	.06¼	.07¼	...	.07¼
Wheat, thick, bgs lb.	.06¼ nom.	.06¼	.07	.07	.08½
Strontium carbonate, 600 lb bbls, wks lb.	.07¼ .07½	.07¼	.07½	.07¼	.07½
Nitrate, 600 lb bbls, NY lb.	.08¼ .09¼	.07¾	.09¼	.07¾	.08¼
Sucrose octa-acetate, den, grd, bbls, wks lb.	... .45	...	.45	...	.45
tech, bbls, wks lb.	... .40	...	.40	...	.40
Sulfur, crude, f.o.b. mines ton	18.00 19.00	18.00	19.00	18.00	19.00
Flour, coml, bgs 100 lb.	1.65 2.35	1.65	2.35	1.65	2.35
bbls 100 lb.	1.95 2.70	1.95	2.70	1.95	2.70
Rubbermakers, bgs 100 lb.	2.20 2.80	2.20	2.80	2.20	2.80
bbls 100 lb.	2.55 3.15	2.55	3.15	2.55	3.15
Extra fine, bgs 100 lb.	2.85 3.00	2.85	3.00	2.85	3.00
Superfine, bgs 100 lb.	2.65 2.80	2.65	2.80	2.65	2.80
bbls 100 lb.	2.25 3.10	2.25	3.10	2.25	3.10
Flowers, bgs 100 lb.	3.00 3.75	3.00	3.75	3.00	3.75
bbls 100 lb.	3.35 4.10	3.35	4.10	3.35	4.10
Roll, bgs 100 lb.	2.35 3.10	2.35	3.10	2.35	3.10
bbls 100 lb.	2.50 3.25	2.50	3.25	2.50	3.25
Sulfur Chloride, 700 lb drs, wks lb.	.03 .04	.03	.04	.02½	.04
Sulfur Dioxide, 150 lb cyl lb.	.07 .09	.07	.09	.07	.09
Multiple units, wks lb.	.04½ .07	.04½	.07	.04½	.07
tks, wks lb.	.04 .05	.04	.05	.04	.05
Refrigeration, cyl, wks lb.	.16 .17	.16	.17	.15	.17
Multiple units, wks lb.	.07½ .10	.07½	.10	.07½	.10
Sulfuryl Chloride lb.	.15 .40	.15	.40	.15	.40
Sumac, Italian, grd ton	... 67.00	62.00	67.00	58.50	65.00
Extract, 42°, bbls lb.	.05¼ .06¼	.05¼	.06¼	.05¼	.06¼
Superphosphate, 16% bulk, wks ton	... 8.00	8.00	9.00	8.25	9.00
Run of pile ton	... 7.50	7.50	8.50	8.00	8.50
Triple, 44-45%, a. p. a. bulk, wks, Balt. unit ton	... .85	...	.85	.70	.85
Talc, Crude, 100 lb bgs, NY ton	13.00 15.00	13.00	15.00	13.00	15.00
Ref'd, 100 lb bgs, NY ton	14.00 16.00	14.00	16.00	14.00	16.00
French, 220 lb bgs, NY ton	23.00 30.00	23.00	30.00	23.00	30.00
Ref'd, white, bgs, NY ton	45.00 60.00	45.00	60.00	45.00	60.00
Italian, 220 lb bgs to arr ton	60.00 62.00	60.00	62.00	60.00	62.00
Ref'd, white, bgs, NY ton	65.00 70.00	65.00	70.00	65.00	70.00
Tankage Grd, NY unit ‡	... 3.00	2.50	3.00	3.00	4.40
Ungrd unit ‡	... 3.00	2.35	3.00	2.80	4.35
Fert grade, f.o.b. Chgo unit ‡	... 2.65	2.25	2.65	2.75	4.00
South American cif unit ‡	... 3.25	3.00	3.45	3.15	4.25
Tapioca Flour, high grade, bgs lb.	.02 .05½	.02	.05½	.03¼	.05½
Tar Acid Oil, 15%, drs gal.	.22 .25	.22	.25½	.21	.25½
25%, drs gal.	.25½ .28½	.25½	.29½	.24½	.29½
Tar, pine, delv, drs gal.	... .26	...	.26	...	.26
tks, delv, E. cities gal.	... .20	...	.20	...	.20
Tartar Emetic, tech, bbls lb.	.27¾ .28	.26¾	.28	.24¾	.27
USP, bbls lb.	.33 .33½	.32	.33½	.30	.32½

† Bags 15c lower; ‡ + 10; •Bbls. are 20c higher.

Current

	Current Market	1938 Low	1938 High	1937 Low	1937 High
Terpineol, den grade, drs lb.	...	.17	...	.17	.13¾ .14¾
Tetrachlorethane, 650 lb drs lb.	.08	.08½	.08	.08½	.08 .08½
Tetrachloroethylene, drs, tech lb.	...	.09½	...	.09½	... .10½
Tetralene, 50 gal drs, wks lb.	.12	.13	.12	.13	.12 .13
Thiocarbanilid, 170 lb bbls lb.	.20	.25	.20	.25	.20 .25
Tin, crystals, 500 lb bbls, wks lb.	.35	.35½	.31	.35½	.33 .46
Metal, NY lb.	...	.44¼	.3570	.44¼	.41 .66
Oxide, 300 lb bbls, wks lb.	.48	.50	.44	.50	.48 .62
Tetrachloride, 100 lb drs, wks lb.	...	.22½	.18½	.22½	.21 .32
Titanium Dioxide, 300 lb bbls lb.	.15¼	.16	.15¼	.17	.16¼ .17
Barium Pigment, bbls lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06 .06⅜
Calcium Pigment, bbls lb.	.05⅝	.05⅞	.05⅝	.06⅜	.06 .06⅜
Toluidine, mixed, 900 lb drs, wks lb.	.26	.27	.26	.27	.26 .27
Toluol, 110 gal drs, wks gal.	...	.27	.27	.35	... .35
8000 gal tks, frt all'd gal.	...	.22	.22	.30	... .30
Toner Lithol, red, bbls lb.	.75	.80	.75	.80	.75 .80
Para, red, bbls lb.	.75	.80	.75	.80	... .75
Toluidine, bgs lb.	...	1.35	...	1.35	... 1.35
Triacetin, 50 gal drs, wks lb.	...	.36	...	.36	... .36
Triamyl Borate, lcl, drs, wks lb.	...	.27	...	.27	... .27
Triamylamine, c-l, drs, wks lb.	.77	1.25	.77	1.25	.77 1.25
Tributylamine, lcl, drs, wks lb.	...	.70	...	.70	... ...
Tributyl citrate, drs, frt all'd lb.	...	.45	...	.45	... .45
Tributyl Phosphate, frt all'd lb.	...	.50	...	.50	... .50
Trichlorethylene, 600 lb drs, frt all'd E. Rocky Mts lb.	.089	.094	.089	.094	.089 .094
Tricresyl phosphate, tech, drs lb.	.24½	.39	.24½	.39	.22½ .26½
Triethanolamine, 50 gal drs wks lb.	.21	.22	.21	.22	.21 .30
tks, wks lb.	...	.20	...	.20	.20 .25
Triethylene glycol, drs, wks lb.	...	.26	...	.26	... ...
Trihydroxyethylamine Oleate, bbls lb.	...	.30	...	.30	... ...
Stearate, bbls lb.	...	.30	...	.30	... ...
Trimethyl Phosphate, drs, lcl fob dest lb.	...	.50	...	.50	... ...
Trimethylamine, c-l, drs, frt all'd E. Mississippi lb.	...	1.00	...	1.00	... 1.00
Triphenylguanidine lb.	.58	.60	.58	.60	.58 .60
Triphenyl Phosphate, drs lb.	...	.38	.34	.38	... ...
Tripoli, airfloated, bgs, wks ton	26.00	30.00	26.00	30.00	25.00 30.00
Turpentine (Spirits), c-l, NY dock, bbls gal.	...	.29	.27½	.31½	.31 .47
Savannah, bbls gal.	...	.23½	.22¼	.30¾	.25 .42
Jacksonville, bbls gal.	...	.23¾	.22½	.30¾	.25 .41
Wood Steam dist, bbls, c-l, NY gal.	...	.27	.27	.31	.30 .44
Wood, dest dist, c-l, drs, delv E. cities gal.	...	.36	.33	.36	... ...
Urea, pure, 112 lb cases lb.	.14½	.15½	.14½	.15½	.14½ .15½
Fert grade, bgs, c.i.f. ton	...	...	...	...	... ...
c.i.f. S.A. points ton	95.00	110.00	95.00	110.00	95.00 110.00
Dom, f.o.b., wks ton	95.00	101.00	95.00	101.00	95.00 101.00
Urea Ammonia liq 55% NH_3, tks unit	...	1.00	1.00	1.04	1.00 1.04
Valonia beard, 42%, tannin bgs ton	.	45.00	45.00	52.00	35.00 52.00
Cups, 32% tannin, bgs ton	32.00	34.00	33.00	37.50	31.50 36.00
Extract, powd, 63% lb.	...	.06	...	.06	... ...
Vanillin, ex eugenol, 25 lb tins, 2000 lb lots lb.	...	2.25	2.25	3.10	3.10 3.65
Ex-guaiacol lb.	...	2.15	2.15	3.00	3.00 3.55
Ex-lignin lb.	...	2.15	2.15	2.25	... ...
Vermilion, English, kgs lb.	1.55	1.69	1.45	1.69	1.60 1.90
Wattle Bark, bgs ton	39.75	41.75	39.75	41.75	31.00 43.75
Extract, 60°, tks, bbls lb.	...	.04¾	.04⅜	.04⅝	.03⅝ .04⅝
WAXES					
Wax, Bayberry, bgs lb.	.16⅞	.17	.16⅞	.17	.16½ .17½
Bees, bleached, white 500 lb slabs, cases lb.	.37	.39	.35	.45	.38 .45
Yellow, African, bgs lb.	.22	.25½	.22	.26	.25 .30
Brazilian, bgs lb.	.23	.25	.23	.29	.27 .34
Chilean, bgs lb.	.23	.25	.23	.29	.27 .34
Refined, 500 lb slabs, cases lb.	.33	.33½	.32	.39	.29½ .39
Candelilla, bgs lb.	.14½	.15½	.13½	.15½	.13 .16½
Carnauba, No. 1, yellow, bgs lb.	.41	.41½	.38	.44	.42 .49
No. 2, yellow, bgs lb.	.40	.41	.36	.42	.41 .46½
No. 2, N. C., bgs lb.	.37	.37½	.35½	.40	.38 .43
No. 3, Chalky, bgs lb.	.33½	.35½	.31½	.35½	.33 .40
No. 3, N. C., bgs lb.	.33½	.35½	.31½	.35½	.34 .43
Ceresin, dom, bgs lb.	.08½	.11½	.08½	.11½	.08 .12
Japan, 224 lb cases lb.	.09¼	.09½	.09¼	.10½	.09½ .11¼
Montan, crude, bgs lb.	.11	.12	.11	.12	.11 .12
Paraffin, see Paraffin Wax.					
Spermaceti, blocks, cases lb.	.23	.24	.23	.24	.23 .24
Cakes, cases lb.	.24	.25	.24	.25	.24 .25
Whiting, chalk, com, 200 lb bgs c-l, wks ton	12.00	14.00	12.00	14.00	12.00 14.00
Gilders, bgs, c-l, wks ton	...	15.00	...	15.00	... 15.00
Wood Flour, c-l, bgs ton	20.00	33.00	20.00	33.00	18.00 30.00
Xylol, frt allowed, East 10° tks, wks gal.	...	.29	.29	.33	... .33
Coml, tks, wks, frt all'd gal.	...	.26	.26	.30	... .30
Xylidine, mixed crude, drs lb.	.35	.36	.35	.36	.35 .36
Zinc Acetate, tech, bbls, lcl, delv lb.	...	.21	...	.21	... ...
Arsenate, bgs, frt all'd lb.	.12½	.13	.12½	.13½	... ...
Arsenite, bgs, frt all'd lb.	.12½	.13	.12½	.13	... ...
Carbonate tech, bbls, NY lb.	.14	.15	.14	.15	.12 .15
Chloride fused, 600 lb drs, wks lb.	.04½	.046	.04½	.046	.04½ .046
Gran, 500 lb drs, wks lb.	.05	.05¾	.05	.05¾	.05 .05¾
Soln 50%, tks, wks 100 lb.	...	2.25	...	2.25	2.00 2.25
Cyanide, 100 lb drs lb.	...	.33	.33	.38	.36 .38
Dust, 500 lb bbls, c-l, delv lb.	...	.06¾	.06	.0740	.0740 .094

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Prices—Current

	Current Market		1938 Low	1938 High	1937 Low	1937 High
Zinc (continued):						
Metal, high grade slabs, c-l, NY	lb.	5.15	4.35	5.35	5.35	7.85
E. St. Louis	100 lb.	4.75	4.00	5.00	5.00	7.50
Oxide, Amer, bgs, wks	lb. .06¼	.07½	.06	.07½	.05¼	.07¾
French 300 lb bbls, wks	lb. .06¼	.07¾	.06¼	.07¾	.05½	.07¾
Palmitate, bbls	lb. .23	.25	.23	.25	.23	.25
Resinate, fused, pale, bbls	lb. ...	.10	...	.10	.09	.10
Stearate, 50 lb bbls	lb. .20	.23	.20	.23	.20	.23
Zinc Sulfate, crys, 400 lb bbl, wks	lb. ...	.029	.029	.033	.028	.033
Flake, bbls	lb. ...	.0325	.0325	.0375	.032	.0375
Sulfide, 500 lb bbls, delv	lb. .08⅝	.08⅞	.08⅝	.09¾	.09¼	.09¾
bgs, delv	lb. .08⅜	.08⅝	.08⅜	.09	.09	.09½
Sulfocarbolate, 100 lb kgs	lb. .24	.26	.24	.26	.24	.26
Zirconium Oxide, crude, 73-75% grd, bbls, wks	ton 75.00	100.00	75.00	100.00	...	...
kgs, wks	lb. .04¼	.04½	.04¼	.04½	...	...

Oils and Fats

Babassu, tks, futures	lb. ...	.06⅝	.06¼	.06¾	.06¾	.11¼
Castor, No. 3, 400 lb bbls	lb. .09¼	.10	.09¼	.10¾	.10¼	.10¾
Blown, 400 lb bbls	lb. .11¼	.12	.11¼	.13	.12¼	.13
China Wood, drs, spot NY	lb. .14¾	.15	.10¾	.15¼	.12½	.23
Tks, spot NY	lb. .143	.14½	.095	.15½	.118	.23
Coconut, edible, bbls NY	lb. ...	.09	.09	.09½	.09½	.15
Manila, tks, NY	lb. ...	.03⅜	.03¼	.04¼	.04	.09½
Tks, Pacific Coast	lb. ...	.03⅜	.03	.03¾	.03¾	.08⅞
Cod, Newfoundland, 50 gal bbls	gal. .38	nom.	.38	.52	.51	.52
Copra, bgs, NY	lb.	.0190	.0185	.0235	.0235	.055
Corn, crude, tks, mills	lb. .08	.08¼	.06⅝	.08¼	.06½	.10¾
Refd, 375 lb bbls, NY	lb. .10¼	.10½	.09¼	.10½	.09	.13¾
Degras, American, 50 gal bbls, NY	lb. .07¾	.08¼	.07½	.08¼	.07½	.08¼
English, bbls, NY	lb. .07¾	.08¼	.07½	.08¼	.07½	.08¼
Greases, Yellow	lb. .05	.05¼	.03½	.05½	.04¼	.09
White, choice bbls, NY	lb. .06	.06¼	.05	.07	.06¾	.10¼
Lard Oil, edible, prime	lb. ...	.12¾	.11⅞	.12¾	.12¾	.16¾
Extra, bbls	lb. ...	.09½	.09⅜	.10¾	.10¾	.13½
Extra, No. 1, bbls	lb. ...	.09	.08⅞	.09¾	.09¼	.13½
Linseed, Raw less than 5 bbl lots	lb. .090	.092	.090	.115	.107	.121
bbls, c-l, spot	lb. .086	.088	.086	.112	.099	.113
Tks	lb. .08	.082	.08	.096	.093	.107
Menhaden, tks, Baltimore	gal. .30	nom.	.34½	.37½	.34	.45
Refined, alkali, drs	lb. .07½	.077	.07½	.095	.08	.10
Tks	lb. ...	.069	.069	.087	.074	.09
Kettle bodied, drs	lb. .084	.086	.084	.105	.09	.11
Light pressed, drs	lb. .069	.0710	.069	.091	.074	.094
Tks	lb. ...	.063	.063	.08	.067	.084
Neatsfoot, CT, 20°, bbls, NY	lb. ...	.15¼	.15¼	.17¼	.16¾	.18¼
Extra, bbls, NY	lb. ...	.09¼	.09⅛	.10	.09½	.13¾
Pure, bbls, NY	lb. ...	.11¾	.11¾	.12¼	.11¾	.14¼
Oiticica, bbls	lb. .11½	nom.	.09¼	.12¾	.10⅞	.17
Oleo, No. 1, bbls, NY	lb. ...	.09¼	.08½	.10½	.10½	.14½
No. 2, bbls, NY	lb. ...	.08½	.08	.10	.10	.14
Olive, denat, bbls, NY	gal. .94	.98	.88	1.20	1.15	1.65
Edible, bbls, NY	gal. 1.75	2.00	1.75	2.35	2.20	2.50
Foots, bbls, NY	lb. .08	.08⅛	.07⅞	.09⅞	.09⅝	.12½
Palm, Kernel, bulk	lb. ...	.04⅛	.04⅛	.04½	.04½	.08⅛
Niger, cks	lb. .04	.04¼	.032	.04½	.04	.07¼
Sumatra, tks	lb. ...	.03	.03	.0375	.0375	.06½
Peanut, crude, bbls, NY	lb. ...	.08¼	.07	.08¼	.06¼	.10⅝
Tks, f.o.b. mill	lb. ...	.08	.06⅝	.08	.06½	.10¼
Refined, bbls, NY	lb. .10½	.10¾	.09¾	.10¾	.10	.13½
Perilla, drs, NY	lb. .10¾	.11	.10	.11¾	.11	.13½
Tks, Coast	lb. .10	.10¼	.096	.11	.105	.13
Pine, see Pine Oil, Chemical Section.						
Rapeseed, blown, bbls, NY	lb. .14	.14½	.14	.14¾	.13	.14¾
Denatured, drs, NY	gal. .75	.80	.75	.91	.85	.97
Red, Distilled, bbls	lb. ...	.08⅜	.08⅜	.10⅝	.09⅝	.12⅝
Tks	lb. ...	.07½	.07½	.09¾	.08¾	.10¾
Sardine, Pac Coast, tks	gal. .30	nom.	.30	.46½	.35	.55
Refined alkali, drs	lb. .07½	.077	.07½	.095	.08	.10
Tks	lb.	.069	.069	.087	.074	.09
Light pressed, drs	lb. .069	.077	.069	.089	.074	.094
Tks	lb. ...	.063	.063	.08	.067	.084
Sesame, yellow, dom	lb. ...	.10½	.10¼	.10½	.10¼	.13¼
White, dom	lb. ...	.10½	.10¼	.10½	.10¼	.13¼
Soy Bean, crude						
Dom, tks, f.o.b. mills	lb. ...	.067	.06	.07	.06	.10½
Crude, drs, NY	lb. .073	.077	.066	.08	.066	.11½
Ref'd, drs, NY	lb. .083	.087	.078	.097	.078	.12½
Tks	lb. .072	.077	.072	.082	.072	.11½
Sperm, 38° CT, bleached, bbls NY	lb. .10	.102	.10	.102	.096	.102
45° CT, bleached, bbls, NY	lb. .093	.095	.093	.095	.089	.095
Stearic Acid, double pressed dist bgs	lb. .11	.12	.11	.12	.11	.13½
Double pressed saponified bgs	lb. .11¼	.12¼	.11¼	.12¼	.11¼	.13¾
Triple pressed dist bgs	lb. .14	.15	.14	.15	.14	.16½
Stearine, Oleo, bbls	lb. .08¼	.08½	.05½	.08½	.07	.11½
Tallow City, extra loose	lb. ...	.05⅝	.04¾	.06⅜	.05⅞	.09¼
Edible, tierces	lb. .07	.07¼	.06	.07¼	.06⅞	.10¼
Acidless, tks, NY	lb.	.08¼	.08	.09¼	.09	.13
Turkey Red, single, bbls	lb. .06¼	.08½	.06¼	.08½	.08	.08½
Double, bbls	lb. .09½	.11	.09½	.13	.12½	.13
Whale:						
Winter bleach, bbl, NY	lb .087	.089	.087	.10	.091	.111
Refined, nat, bbls, NY	lb .083	.085	.083	.096	.087	.107

ADVERTISING PAGES REMOVED

Index to Advertisers

Monsanto Chemical Co. 177
Morgan, Inc., Clarence 220
Mutual Chemical Co. of America, Inc. 125

National Aniline & Chemical Co., Inc. 154
Natural Products Refining Co. 132
Neuberg, Inc., William 219
Niacet Chemicals Corp. 201
Niagara Alkali Co. 170

Oldbury Electro-Chemical Co. 210

Pacific Coast Borax Co. 209
Paramet Chemical Corp. 209
Patterson Foundry & Machine Co. 219
Pennsylvania Alcohol Corp. 150
Pennsylvania Coal Products Co. 219
Petrometer Corp. 219
Pfizer, Chas. & Co., Inc. 192
Phelps Dodge Refining Corp. 207
Philadelphia Quartz Co. 216
Polachek, Z. H. 221
Prior Chemical Corp. 178
Puritan Compressed Gas Corp. 201

Ross & Rowe, Inc. 216

Sharples Solvents Corp. 181
Slomon, Ira I. 221
Sobin Co., Inc., Irving M. 220
Solvay Sales Corporation ..... Cover 2
Standard Silicate Division Diamond Alkali Co. 188
Starkie Co., A. E. 196
Starkweather Co., J. U. 220
Stauffer Chemical Co. 128
Stroock & Wittenberg Corp. 209

Tennessee Corp. 219
Texas Gulf Sulphur Co. 165
Textile Products Co. 220
Turner & Co., Joseph 203

Union Carbide & Carbon Corp. 129
U. S. Industrial Alcohol Co. ..... Insert facing pages 168 and 169
U. S. Industrial Chemical Co. ..... Insert facing pages 168 and 169
U. S. Phosphoric Products Corp. 219
U. S. Potash Co. 212

Victor Chemical Works 159

Warner Chemical Co. 121
Wishnick-Tumpeer, Inc. ..... Cover 4

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and
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AGENTS

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GENERAL DYESTUFF CORPORATION
435 HUDSON STREET NEW YORK, N. Y.

"We"—Editorially Speaking

"We" have been chided for being pessimistic—maybe so and maybe not—but we do like the mental slant of a big calcium chloride maker who, in the midst of last month's deluge, was asked why he was so cheerful.

"Surely," said one of his confrères, "there's no demand for a good dust layer in this weather."

"Wait till August," he replied. "Bridges are not the only thing that rain washes out of a highway."

❖❖❖❖

Did you know that—

The average American eats 11 pounds of crackers a year.

Only four per cent. of the adult population of the United States pays any income tax.

From 15 to 18 pounds of sulfur (in insecticides and fertilizers) are needed to grow a bale of cotton.

North and South Dakota in the fiscal years 1933-37 received each over 3800 per cent. of revenues collected by the Federal Government back as relief payments; Mississippi 2049 per cent. and New Mexico 2392 per cent.; while Arizona, Arkansas, Idaho, Montana, and Wyoming each received over 1000 per cent.

The following states have received less relief payments than they paid in taxes: California 90 per cent., Connecticut 56 per cent., Delaware 18 per cent., Illinois 71 per cent., Kentucky 56 per cent., Maryland 54 per cent., Massachusetts 87 per cent., Michigan 61 per cent., New Jersey 61 per cent., New York 50 per cent., North Carolina 23 per cent., Ohio 94 per cent., Pennsylvania 79 per cent., Rhode Island 57 per cent., and Virginia 31 per cent.

The chemical industry's largest rubber lined tank holds 120,000 gallons and is appropriately in Texas.

❖❖❖❖

Speaking with feeling, *The Jewel Double Quick Cadet,* house organ of the Jewel Paint & Varnish Co., says:

My son, never speak unkindly of PRICE CUTTERS,
Never knock them because God made them
The same as he made crabs, fleas, buzzards,
Lizards, roaches, ants, centipedes, lice, bugs, wasps,
Snakes, skunks, and other unpleasant things.
In His inestimable wisdom He made them—
Why He made them only He knows.
Some day He may enlighten us but up to now,
I'll be damned if I understand.

❖❖❖❖

"We" wonder what Frank Washburn, who thirty-five years ago was the first to visualize a power development at Muscle Shoals, would think could he return to see the plants now built, and learn at what cost, and observe how they are being operated. Next month we publish the biography of this founder of the Cyanamid Co. and builder of the original Muscle Shoals plant—an article of fascinating, timely interest, and a delicious commentary on the current Congressional investigation.

T.V.A. is manufacturing fine chinaware at Norris Dam which does seem a wee bit afield from cheap power and fertilizers, so that apparently the "yardstick" isn't the sole flexible element in their set-up.

❖❖❖❖

One of the industry's "unsung heroes" is F. W. Dennis who does a manful job for safety as editor of the *News Letter* of our section of the National Safety Council.

❖❖❖❖

The British chemical press complains that the Chief Alkali Inspectors' Annual Report has changed from fatherly advice to disciplinary admonition—sounds familiar doesn't it?

❖❖❖❖

Two of our largest chemical companies have instructed that all vacations be taken by the end of this month, so that all the armament races are evidently not in Europe. Unless business is more plentiful September promises to be an interesting month, and if it does recover, it will be anyway.

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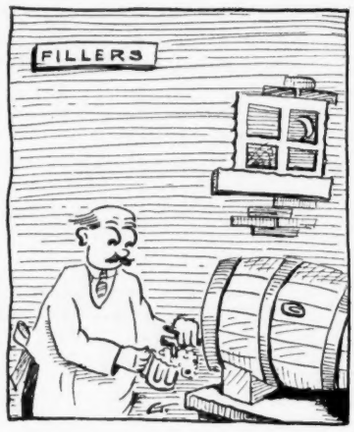
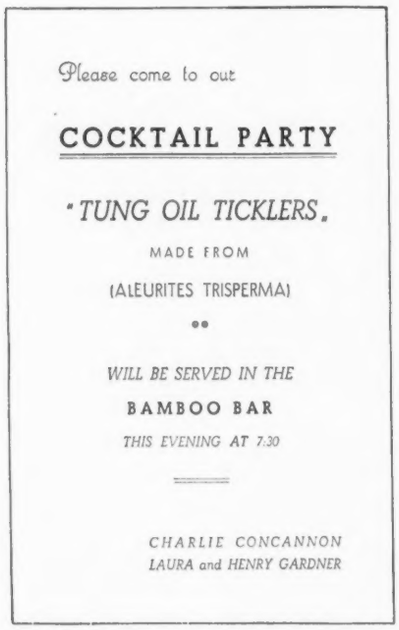
And upon this optimistic note, let us close and all go to the beach for a nice cool swim.



Courtesy, "Industrial Finishing"



Which just goes to show that being a delegate to the Tenth International Congress of Chemistry has its compensations after all.

Fifteen Years Ago

From our issues of August, 1923

Wm. D. Neuberg, Jr., is now connected with George Uhe, broker.

National Lead Company acquires National Pigments & Chemical Company.

Four Baltimore sulfuric acid manufacturers to merge: Standard Wholesale Phosphate Co., Standard Acid Works, Union Acid Works, and U. S. Guano.

National Aniline & Chemical Co. wins patent suit involving use of diphenylguanidine.

Philadelphia Quartz Co., Phila., Pa., to build a one and two-story plant at Jeffersonville, Ind., for production of silicate of soda.

State of Chemical Trade

Current Statistics (July 31, 1938)—p. 15

WEEKLY STATISTICS OF BUSINESS

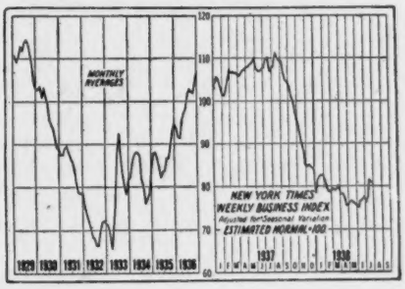
Week Ending	Carloadings 1938	Carloadings 1937	Carloadings % of Change	Electrical Output* 1938	Electrical Output* 1937	Electrical Output* % of Change	Jour. of Com. Price Index	Nat'l Fertilizer Ass'n Price Indices: Chem. & Drugs	Fats & Oils	Fert. Mat.	Mixed Fert.	All Groups	†Labor Dept. Chem. & Drug Price Index	% Steel Activity	N. Y. Times Index Bus. Act.	Fisher's Index Pur. Power
June 25	558,937	769,945	—27.4	2,019,036	2,238,332	— 9.8	76.4	93.7	60.8	69.1	76.8	74.1	76.1	28.7	77.4	123.3
July 2	588,864	802,346	—26.6	2,014,702	2,238,268	—10.0	76.2	94.7	61.1	69.1	76.8	74.2	76.7	22.4	76.2	123.7
July 9	501,013	678,958	—26.2	1,881,298	2,096,266	—10.3	77.7	94.7	62.2	69.2	76.8	74.7	76.8	32.3	77.3	123.1
July 16	602,300	766,384	—21.4	2,089,772	2,298,005	— 9.1	77.3	94.7	63.7	69.6	77.1	74.7	77.1	36.4	81.3	122.4
July 23	580,882	767,470	—24.3	2,084,763	2,258,776	— 7.7	76.6	94.2	63.3	69.8	77.1	74.6	77.0	37.0	80.8	122.7
July 30	.....	.....	.....	.....	.....	.....	77.6	...	...	...	...	...	...	...	...	122.5

* K.W.H., 000 omitted; † 1926-1928 = 100.0.

MONTHLY STATISTICS

CHEMICAL:	June 1938	June 1937	May 1938	May 1937	April 1938	April 1937
Acid, sulfuric (expressed as 50° Baumé, short tons, Bureau of the Census)						
Total prod. by fert. mfrs.	.....	154,275	137,764	176,703	143,469	180,040
Consumpt. in mfr. fert.	.....	121,716	119,218	146,301	110,496	172,936
Stocks end of month	.....	76,052	87,120	67,475	93,494	68,352
Alcohol, Industrial (Bureau Internal Revenue)						
Ethyl alcohol prod., proof gal.	16,395,184	18,657,582	14,226,450	16,938,983	12,739,423	16,824,151
Comp. denat. prod., wine gal.	2,492,965	878,226	899,696	921,937	297,743	255,623
Removed, wine gal.	2,437,777	814,063	823,778	919,461	300,348	261,524
Stocks end of mo., wine gal.	699,771	857,663	641,284	794,475	546,054	792,893
Spec. denat. prod., wine gal.	5,376,687	7,441,693	5,190,640	6,515,668	5,989,710	6,843,259
Removed, wine gal.	5,374,813	7,419,345	5,268,695	6,591,728	6,063,471	6,454,712
Stocks end of mo., wine gal.	491,850	799,468	495,937	783,906	581,235	864,449
Ammonia sulfate prod., tons *a*	27,967	64,093	32,000	71,903	34,344	69,820
Benzol prod., gals. *b*	4,413,000	9,517,000	4,905,000	10,448,000	5,385,000	10,328,000
Byproducts coke, prod., tons *a*	2,066,530	4,024,259	2,282,621	4,478,667	2,436,264	4,348,826
Cellulose Plastic Products (Bureau of the Census)						
Nitrocellulose sheets, prod., lbs.	.....	1,164,875	415,981	1,237,034	453,596	1,239,686
Sheets, ship., lbs.	.....	1,234,223	503,539	1,072,196	525,132	1,174,223
Rods, prod., lbs.	.....	292,784	212,167	297,904	199,119	347,078
Rods, ship., lbs.	.....	294,391	192,875	315,409	201,392	358,330
Tubes, prod., lbs.	.....	78,549	40,096	91,860	37,989	105,171
Tubes, ship., lbs.	.....	71,112	58,610	62,086	51,179	95,570
Cellulose acetate, sheets, rods, tubes						
Production, lbs.	.....	1,112,603	257,722	1,170,106	249,185	1,410,637
Shipments, lbs.	.....	1,042,937	253,491	1,098,812	259,209	1,313,195
Methanol (Bureau of the Census)						
Production, crude, gals.	.....	485,943	330,875	522,961	314,664	531,727
Production, synthetic, gals.	.....	2,263,507	1,860,400	2,353,497	1,925,999	2,138,895
Pyroxylin-Coated Textiles (Bureau of the Census)						
Light goods, ship., linear yds.	.....	3,146,915	2,558,834	3,664,620	2,596,269	4,314,429
Heavy goods, ship., linear yds.	.....	1,870,658	1,513,237	2,062,580	1,640,483	2,451,581
Pyroxylin spreads, lbs. *c*	.....	4,957,803	4,149,846	5,555,434	4,334,123	7,155,521
Exports (Bureau of Foreign & Dom. Commerce)						
Chemicals and related prod. *d*	.....	.....	.....	.....	$11,459	$12,385
Crude sulfur *d*	$1,048	$1,002	$956	$1,229	$1,130	$767
Coal-tar chemicals *d*	$821	$1,336	$980	$1,748	$1,025	$1,422
Chemical specialties *d*	.....	.....	.....	.....	$2,508	$2,521
Industrial chemicals *d*	$1,992	$2,449	$2,088	$2,946	$2,269	$2,463
Imports						
Chemicals and related prod. *d*	.....	.....	.....	.....	$6,728	$11,020
Coal-tar chemicals *d*	$887	$1,876	$1,579	$1,600	$1,256	$1,742
Industrial chemicals *d*	$1,434	$2,561	$1,188	$2,632	$1,159	$2,676
Payrolls (U. S. Dept. of Labor, 3 year av., 1923-25=100)						
Chemicals and allied prod., including petroleum	114.5	173.4	117.7	136.7	116.3	136.4
Other than petroleum	167.9	135.7	111.3	136.2	110.9	136.2
Chemicals	117.1	153.5	115.9	152.5	116.6	150.6
Explosives	89.2	103.0	85.9	103.2	86.5	107.6
Employment (U. S. Dept. of Labor, 3 year av., 1923-25 =100)						
Chemicals and allied prod., including petroleum	103.6	123.9	107.2	124.5	110.4	126.6
Other than petroleum	100.2	123.4	104.8	124.6	108.6	127.7
Chemicals	107.7	138.5	107.6	137.5	109.4	135.6
Explosives	84.7	94.8	84.8	90.7	86.0	92.4
Stocks of chemicals, etc.:**						
Finished	.....	141	177	144	183	148
Raw material	.....	74	87	75	92	75
Price index chemicals	.....	90.1	81.2	91.1	81.9	94.2
Chem. and drugs	.....	83.6	76.8	84.5	77.5	86.9
Fert. mat.	.....	70.5	69.6	70.6	70.1	70.7

Industrial Trends



Business: Activity showed marked gains last month, with sentiment generally reported as increasingly optimistic. The actual, definite improvement is all the more remarkable because it is contrary to normal trend and is being sustained. *The Journal of Commerce* weekly index of business activity reached a new high for '38; while the *N. Y. Times* index reached its highest point since the week of Jan. 29.

Steel: Activity near the end of the month jumped to 36%, the highest rate in 8 months. The more optimistic in the industry now believe that August rate will average better than 40%, while September and October activity is expected, of course, to show up much better. In these months much better buying by the automotive field is expected.

Automobiles: Production during July dropped to a seasonal low, the total being estimated somewhere around 100,000 units. Car inventories are declining in an encouraging manner which leads the industry to believe that there will be a shortage in September, forcing a speed-up in the introduction of new models.

Retail Trade: Summer lines are moving better, although the rainy week throughout the East did put a damper on sales.

Wholesale Trade: The continued improvement in business sentiment is bringing in larger and more diversified orders. The outlook has changed considerably in 30 days.

Employment: June employment fell off 100,000 less than the reductions oc-

State of Chemical Trade
Current Statistics (July 31, 1938)—p. 15

State of Chemical Trade

Current Statistics (July 31, 1938) p. 16

curring in April and May. Reports from various sections of the country indicate that rehiring is now prevalent in many fields. July figures should be more encouraging.

Textiles: In response to the heavy buying over the past 6 weeks manufacturers are extending their operations. Cotton production is better, the same thing is true of woolens, only to a lesser extent. Silk operations are improving and rayon plants are moving up production schedules.

Glass: Production outlook is much brighter. July production of plate glass is thought to have been heavier than in June, which was the best month so far this year.

Rubber: Orders for tires and other rubber goods have increased to the point where optimism is beginning to take the place of deep pessimism in the Akron and other rubber centers.

Construction: Residential building is encouraging. The outlook over the balance of the year is good.

Paper: Even the more conservative elements in this industry are now revising their estimates of business over the balance of '38. Currently operations are around the 68-70% level, with indications that an increase will be necessary in August.

Leather: Distinct improvement in the shoe business is noted by leading manufacturers and retailers. Production is being stepped up to take care of incoming orders.

Carloadings: Weekly figures still make poor comparison with the corresponding weeks of last year, running anywhere from 27% to 21% behind.

Commodity Prices: The upturn in the general commodity markets continued last month, led by the metals. Buyers are anxiously watching this trend to see if it is sustained. Still higher prices in August will probably bring consumers into the markets for sizable forward commitments.

Electrical Output: Figures are beginning to show gains, although still behind corresponding weeks of '37.

Outlook: The entire business picture in the U.S. has changed in the past 30 days. The slight pick-up in June was thought by many to be a "flash-in-the-pan." However, although the seasonal trend is normally down in July, business generally has stopped marking time and is again on the recovery road. While the actual gains in many lines may be small, the trend is there for all to see. A feeling of distinct optimism is now prevalent, and there are indeed few who do not expect to see a busy fall. Sales gains marked the chemical industry, forecasting a betterment in September and October.

MONTHLY STATISTICS (cont'd)

FERTILIZER:	June 1938	June 1937	May 1938	May 1937	April 1938	April 1937
Exports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ..	127,496	134,737	127,496	166,234	158,717	137,607
Ammonium sulfate	.....	4,483	146	7,336	118	12,359
Total phosphate rock	.....	90,000	97,038	139,301	132,573	102,562
Total potash fertilizers	.....	21,496	4,437	7,716	11,073	9,712
Imports (short tons, Nat. Fert. Association)						
Fertilizer and fert. materials ...	.....	137,181	126,150	176,659	159,614	288,366
Ammonium sulfate	.....	7,078	7,393	6,492	10,493	7,456
Sodium nitrate	.....	58,887	73,025	85,121	96,688	153,449
Total potash fertilizer	.....	10,804	1,669	13,992	6,561	36,905
Superphosphate c (Nat. Fert. Association)						
Production, bulk	227,223	286,685	227,223	286,685	220,166	307,834
Shipments, total	410,067	482,824	410,067	482,824	756,121	849,386
Northern area	262,122	312,329	262,122	312,329	350,467	350,017
Southern area	147,945	170,495	147,945	170,495	405,654	499,369
Stocks, end of month, total	.....	.....	1,034,204	804,816	1,179,223	960,552
Tag Sales (short tons, Nat. Fert. Association)						
Total, 17 states	117,078	115,827	331,568	309,542	1,108,005	1,399,151
Total, 12 southern	116,361	114,802	275,761	265,502	1,039,765	1,329,605
Total, 5 midwest	717	1,025	55,807	44,040	68,240	69,546
Fertilizer payrolls	66.7	79.2	95.7	116.2	121.1	150.9
Fertilizer employment	61.7	75.7	90.4	104.6	123.0	151.6
Value imports, fert. and mat. *d*	$1,885	$2,616	$2,880	$3,916	$3,580	$5,473
Value exports, fert. and mat. *d*	.....	.....	.....	.....	$1,520	$1,356
GENERAL:						
Acceptances outst'd'g *f*.....	$264	$364	$268	$385	$278	$395
Coal prod., anthracite, tons	3,868,567	4,040,363	3,821,416	3,690,521	3,108,000	6,854,000
Coal prod., bituminous, tons ..	22,850,000	31,776,000	21,266,000	.....	22,195,000	26,041,000
Com. paper outst'd'g *f*.....	$225	$284	$251	$286	$271	$285
Failures, Dun & Bradstreet	1,018	670	1,053	834	1,116	786
Factory payrolls *i*	67.0	102.9	69.2	105.2	70.7	104.9
Factory employment *i*	76.6	101.4	77.5	102.3	79.6	102.1
Merchandise imports *i*	$145,898	$286,224	$148,260	$284,735	$155,501	$280,899
Merchandise exports *i*	$232,686	$265,341	$257,177	$289,922	$274,482	$268,945
GENERAL MANUFACTURING:						
Automotive production	174,667	497,312	192,068	516,919	219,314	536,150
Boot and shoe prod., pairs	26,676,651	34,449,040	30,196,147	35,410,552	33,378,096	40,297,606
Bldg. contracts, Dodge *j*.....	$251,006	$317,742	$283,156	$244,112	$222,016	$270,125
Newsprint prod., U. S., tons ..	.....	.....	68,001	79,024	58,836	78,642
Newsprint prod., Canada, tons.	.....	.....	207,678	310,650	200,794	298,347
Plate glass prod., sq. ft.	5,956,386	19,392,254	3,866,052	19,437,246	3,819,735	.....
Steel ingot prod., tons	1,638,277	4,184,223	1,806,805	5,151,909	1,925,166	5,070,867
% steel capacity	28.46	74.48	30.39	88.79	33.44	90.25
Pig iron prod., tons	1,062,021	2,107,506	1,255,024	3,537,231	1,376,141	3,391,665
U. S. consumpt. crude rub., tons	30,629	51,860	28,947	51,795	27,984	51,589
Cotton consumpt., bales	.....	.....	425,684	669,665	414,392	718,975
Cotton spindles oper.	21,143,988	24,558,398	21,341,750	24,656,284	21,786,054	24,727,106
Silk deliveries, bales	31,492	.....	28,687	.....	33,381	40,561
Rayon ship., index *p*	473	693	444	724	444	702
Rayon employment *i*	278.9	391.4	304.0	384.0	303.1	378.1
Rayon payrolls *i*	258.1	391.8	275.0	382.0	260.3	364.8
Soap employment *i*	91.6	102.5	91.7	103.3	93.8	107.6
Soap payrolls, *i*	106.9	115.1	107.2	113.8	108.5	116.4
Paper and pulp employment *i*..	104.6	120.5	105.4	120.2	106.9	119.1
Paper and pulp payrolls *i*	96.7	124.3	98.7	121.8	99.9	119.6
Leather employment	74.1	98.0	74.0	99.1	74.6	100.0
Leather payrolls *i*	76.6	108.4	74.7	110.0	74.4	111.4
Glass employment *i*	79.7	112.4	80.9	112.3	81.8	110.9
Glass payrolls *i*	76.9	119.4	78.5	118.9	77.1	120.2
Rubber prod. employment *i*	70.6	101.2	71.5	103.6	72.7	96.7
Rubber prod. payrolls *i*.....	63.2	103.8	63.1	109.2	61.7	100.3
Dyeing and fin. employment *i*..	97.7	109.7	101.7	118.8	103.4	123.1
Dyeing and fin. payrolls, *i*	76.9	95.8	83.1	106.2	85.9	114.6
MISCELLANEOUS:						
Gasoline prod., bbls.	.....	.....	48,159	46,929	46,025	44,243
Cottonseed oil consumpt., bbls.	.....	.....	273,266	189,000	231,975	207,405
PAINT, VARNISH, LACQUER, FILLERS:						
Sales 680 establishments	.....	$41,656,085	$36,827,421	$45,254,635	$34,721,597	$46,345,474
Trade sales (580 establishments)	.....	$22,348,182	$22,900,709	$24,206,972	$20,861,998	$25,102,366
Industrial sales, total	.....	$15,343,359	$10,135,607	$16,785,249	$10,392,707	$16,759,108

a Bureau of Mines; *b* Crude and refined plus motor benzol, Bureau of Mines; *c* Based on 1 lb. of gun cotton to 7 lbs. of solvent, making an 8-lb. jelly; *d* 000 omitted, Bureau of Foreign & Domestic Commerce; *e* Expressed in equivalent tons of 16% A.P.A.; *f* 000,000 omitted at end of the month; *i* U. S. Dept. of Labor, 3 year average, 1923-25 = 100; *j* 000 omitted, 37 states; *p* Rayon Organon, 1923-25 = 100; *q* 680 establishments, Bureau of the Census; *r* Classified sales, 580 establishments, Bureau of the Census; *s* 53 manufacturers, Bureau of the Census; *v* In thousands of bbls., Bureau of the Census; ** Indices, Survey of Current Business, U. S. Dept. of Commerce.

Price Trend of Representative Chemical Company Stocks

	June 30	July 8	July 16	July 23	July 30	Net gain or loss last mo.	Price on July 30, 1937	1938 High	1938 Low
Air Reduction	60¾	60½	60⅛	64⅞	61	+ ¼	71½	65¾	40
Allied Chemical ...	172	175	177	179	177	+ 5	239¼	184	124
Am. Cyanamid "B"	23	23⅛	23¼	24¼	24⅛	+ 1⅛	33⅛	26⅝	15½
Am. Agric. Chem.	62½	—	68	77	81¾*	+19¼	95½	83	49
Columbian Carbon	83	88½	—	94	92†	+ 9	121⅜	98½	53¾
Commercial Solv..	8	8¾	9⅛	9⅜	11¾	+ 3¼	14⅛	12¼	5⅞
Dow Chemical ..	125½	136⅛	130	134	135*	+ 9½	122	140⅛	87⅞
Du Pont	119¾	117⅜	121	127¾	126¾	+ 7	159¾	132¾	90½
Hercules Powder.	54½	54½	58½	64	60⅛*	+ 5⅜	161	65¼	42¾
Mathieson Alkali..	21½	27	29½	—	28¼	+ 6¾	37	30½	19¾
Monsanto Chemical	89½	90	90	90½	89⅜	— ⅛	102	94½	67
Std. of N. J.	52⅞	55	55	57¾	57	+ 4⅛	....	58⅜	39¾
Tex. Gulf Sulphur	34	33¾	34	35	35⅜	+ 1⅜	38½	35⅞	26
Union Carbide ...	77¼	79	79	85¼	83¼	+ 6	101¾	87	57
U. S. Ind. Alcohol	22¼	21	21⅞	22¾	20¾	— 1½	32	24¼	13½

* Close Friday, July 29.
† Close July 27.

Earnings Statements Summarized

Company:	Annual dividends	Net income 1938	Net income 1937	Common share earnings 1938	Common share earnings 1937	Surplus after dividends 1938	Surplus after dividends 1937
Abbott Laboratories:							
Six months, June 30 ...	§$1.60	$841,485	$865,335	$1.24	$1.35	.....	.....
Twelve months, June 30	$1.60	1,588,391	1,603,041	2.40	2.50	.....	.....
American Cyanamid:							
June 30 quarter	.60	430,572	1,479,685	$.16	.59	.....	.....
Six months, June 30	.60	524,649	2,844,325	.19	1.13	.....	.....
Atlas Powder:							
June 30 quarter	*y*$3.25	$251,145	$506,741	*h*$.67	*h*$1.68	.....	.....
Six months, June 30 ...	*y*3.25	467,651	867,822	*h*1.19	*h*2.78	.....	.....
Bon Ami Co.:							
**June 30 quarter	*b*$2.50	341,726	361,689	*b*.93	*b*.98	.....	.....
Six months, June 30 ...	*b*$2.50	679,035	678,998	*b*1.85	*b*1.86	.....	.....
Catalin Corp.:							
Six months, June 30 ...	*f*...	‡4,214	‡124,020	....	....	.....	.....
Certain-teed Products:							
June 30 quarter	*f*...	106,619	163,056	....	....	.....	.....
Six months, June 30 ...	*f*...	†82,969	170,072	....	....	.....	.....
Climax Molybdenum:							
June 30 quarter	*y*1.70	1,079,384	*.....	.43	....	.....	.....
‡‡Six months, June 30 .	*y*1.70	3,071,190	*.....	1.22	....	.....	.....
Commercial Solvents:							
June 30 quarter	*e*.30	†149,571	360,606	....	.14	.....	.....
‡‡Six months, June 30 .	*e*.30	†386,071	862,380	....	.30	.....	.....
Consolidated Chemical Industries:							
June 30 quarter		64,897	317,147	*a*.27	*c*.99	.....	.....
Six months, June 30		166,755	677,333	*a*.69	*c*2.12	.....	.....
Freeport Sulphur:							
June 30 quarter	2.00	437,359	*.....	.54	....	.....	.....
Six months, June 30 ...	2.00	865,299	1,279,841	1.06	1.56	.....	.....
General Printing Ink:							
June 30 quarter	*y*.80	164,932	170,164	.15	.16	.....	.....
Six months, June 30 ...	*y*.80	335,096	716,867	.31	.83	.....	.....
Hercules Powder Co.:							
**June 30 quarter	*x*.65	571,107	1,561,422	*j*.33	*j*2.40	.....	.....
Six months, June 30 ...	*x*.65	1,227,134	3,037,012	*j*.73	*j*4.70	.....	.....
Koppers:							
Twelve months, June 30		2,481,076	.....	....	....	.....	.....
MacAndrews & Forbes:							
June 30 quarter	§2.00	185,629	243,151	.51	.70	$3,826	$61,348
Six months, June 30 ...	§2.00	342,650	463,285	.93	1.33	*d*20,956	99,679
Mathieson Alkali Works:							
June 30 quarter	§1.50	193,152	516,726	.18	.58	.....	.....
Six months, June 30 ...	§1.50	365,552	993,778	.34	1.10	.....	.....
Monsanto Chemical:							
June 30 quarter	*y*3.00	523,020	1,441,405	*h*.37	*h*1.29	.....	.....
Six months, June 30 ...	*y*3.00	1,162,551	2,775,259	*j*.89	*h*2.49	.....	.....
New Jersey Zinc:							
June 30 quarter	*w*.50	734,262	2,181,941	.37	1.11	*d*247,370	218,677
Six months, June 30 ...	*w*.50	1,386,858	4,351,782	.70	2.21	*d*576,406	425,254
Skelly Oil Co.:							
June 30 quarter	*y*1.50	613,471	1,901,504	.52	1.79	.....	.....
Six months, June 30	*y*1.50	1,278,241	3,435,917	1.09	3.22	.....	.....
Twelve months, June 30	*y*1.50	4,330,670	6,082,395	3.95	5.65	.....	.....
Texas Gulf Sulphur:							
June 30 quarter	*y*2.50	1,875,443	3,777,398	.49	.98	*d*44,557	897,398
‡‡Six months, June 30 .	*y*2.50	3,715,130	5,877,448	.97	1.53	*d*124,870	1,077,448
Twelve months, June 30	*y*2.50	9,426,963	10,919,455	2.45	2.84	.....	.....
Union Carbide & Carbon:							
June 30 quarter	*y*2.80	3,721,725	10,505,140	.41	1.17	.....	.....
‡‡Six months, June 30 .	*y*2.80	7,931,058	20,452,852	.88	2.27	.....	.....
U. S. Industrial Alcohol:							
Six months, June 30....	*f*...	4,225	302,048	.01	.77	.....	.....
Victor Chemical Works:							
June 30 quarter	*y*1.10	119,296	158,613	.17	*u*.23	.....	.....
Six months, June 30 ...	*y*1.10	275,544	342,487	.39	*u*.49	.....	.....
Westvaco Chlorine Products:							
June 30 quarter	*y*1.00	180,624	189,482	.32	.34	.....	.....
‡‡Six months, June 30 .	*y*1.00	354,461	411,356	.62	.78	.....	.....

y Amount paid or payable in 12 months to and including the payable date of the most recent dividend announcement; *h* on shares outstanding at close of respective periods; ** indicated quarterly earnings as shown by comparison of company's reports for first quarter of fiscal year and the 6 months period; *b* on class B shares; § profit before federal income taxes; *f* no common dividend; ‡ profit before federal income taxes; ‡‡ indicated earnings as made up from quarterly reports; *e* paid in last 12 months; † net loss; *a* on class A stock; *c* on combination class A & B shares; *d* deficit; *x* paid in first 6 months of 1938; *j* on average shares.

Dividends and Dates

Name	Div.	Stock Record	Payable
Amer. Pot. & Chem.	$1.00	July 23	July 29
Am. Smelt. & Ref.	...50c	Aug. 5	Aug. 31
Am. Smelt. & Ref. pf., q	$1.75	July 8	July 30
Archer-Daniels-Midland pf., q	$1.75	July 21	Aug. 1
Atlantic Ref. pf., q	$1.00	July 5	Aug. 1
Atlas Powder pf., q	$1.25	July 20	Aug. 1
Bon Ami Cl. A., q	$1.00	July 15	July 30
Bon Ami Cl. B., q	..62½c	July 15	July 30
Can. Indus. A & B	$1.50	June 30	July 30
Celanese Corp., 7% pf. pf	(no action June 6)		
Colgate-Palmolive-Peet pf., q	$1.50	Sept. 6	Oct. 1
Commercial Solvents	(no action May 25)		
Comp. Indus. Gases	(no action May 4)		
Consol. Chem. Ind. Cl. A, q	.37½c	July 15	Aug. 1
Dow Chemical	.75c	July 30	Aug.15
Dow Chemical pf., q	$1.25	July 30	Aug.15
duPont $4.50 pf., q	$1.12½	July 8	July 25
duPont deb. q	$1.50	July 8	July 25
Eagle Picher Lead	(no action May 26)		
Filtrol Co. of Cal. S	$1.18¾	July 21	July 25
Flintkote Co.	(no action June 1)		
Freeport Sulphur q	...50c	Aug.15	Sept. 1
Gen. Paint Corp.	(no action June 9)		
Hercules Pow. pf., q	$1.50	Aug. 4	Aug.15
Int. Nickel of Canada pf., q	$1.75	July 2	Aug. 1
Merck & Co.	(action deferred June 14)		
Monsanto Chemical pf., S	$2.25	Nov. 10	Dec. 1
Penn. Salt Mfg.	$1.00	Aug.31	Sept.15
Phillips Pet. q	.50c	July 29	Sept. 1
Procter & Gamble q	50c	July 25	Aug.15
Ruberoid Co.	(no action May 24)		
Skelly Oil	.50c	June 20	July 25
Skelly Oil 6% pf., q	$1.50	July 6	Aug. 1
Solvay Am. Corp. pf., q	$1.37½	July 15	Aug. 15
Sun Oil Co., q	.25c	Aug. 25	Sept. 15
Sun Oil Co. pf., q	..$1.50	Aug. 10	Sept. 1
Sylvania Ind. Corp.	(no action June 1)		
Tex. Gulf Sulphur, q	50c	Sept. 1	Sept. 15
Tubize-Chat 7% pf.,	(no action June 14)		
Union Oil of Calif., q	30c	July 18	Aug. 10
United Dyewood, pf., q	$1.75	Sept. 9	Oct. 1
United Dyewood, pf., q	$1.75	Dec. 9	Jan.1,'39
Valspar Corp. $4 pf. Int.	$1.00	July 27	Aug. 1
Vulcan Detinning pf., q	$1.75	Oct. 10	Oct. 20
Westvaco Chlorine Prods. q	.25c	Aug. 1	Sept. 1
Westvaco Chlorine Prods., pf., q	.37½c	July 1	Aug. 1

S—semi-annual.

Atlas Reports $467,651

Report of Atlas Powder and subsidiaries, for 6 months ended June 30, shows net profit of $467,651 after depreciation, federal income taxes, etc., equal after 5% preferred dividends, to $1.19 a share on 249,164 no-par shares of common stock, excluding shares held by company. This compares with $867,822 or $2.78 a share on 250,899 common shares for the 6 months ended June 30, '37.

For quarter ended June 30, net profit was $251,145 equal to 67c a share on common, comparing with $506,741 or $1.68 a common share in June quarter of previous year and $216,506 or 52c a share in quarter ended March 31, '38.

Stocks Up $328,589,000

Chemical stocks listed on the N. Y. Stock Exchange gained $328,589,000 in July. On July 31 the market value reached $5,538,589,000, as compared with $5,210,000,000 on June 30.

Chemical Finances

July 1938—p. 16

Chemical Stocks and Bonds

July Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales	Stocks	Par $	Shares Listed	Dividends*	Earnings** $-per share-$ 1937	1936	1935
							Number of shares July 1938	1938						
NEW YORK STOCK EXCHANGE														
51	52	36¼	55	36	...	...	3,700	11,700	Abbott Labs.	No	640,000	$2.10	2.51	2.21	1.77
61	65¾	40	80¼	44½	86½	58	43,600	216,500	Air Reduction	No	2,566,191	3.00	2.86	2.79	2.05
177	184	124	258½	145	345	157	16,300	113,400	Allied Chem. & Dye	No	2,214,099	7.50	11.19	11.44	8.71
81¾	83	49	101½	53½	89	49	5,200	17,500	Amer. Agric. Chem.	No	210,932	7.75	8.86	4.71	6.37
13⅝	14¾	9	30¾	8¼	35⅜	20½	27,800	63,000	Amer. Com. Alcohol	20	260,930	.50	3.23	4.55	3.16
29	30¾	20	46	22	50	37	3,900	13,600	Archer-Dan.-Midland	No	549,546	2.00	5.03	3.05	4.20
57	58	36	94	38	84	48	3,100	17,500	Atlas Powder Co.	No	248,145	2.25	4.40	4.21	2.81
118¼	119	105	133	101	131	112	250	1,800	5% conv. cum. pfd.	100	68,597	5.00	20.90	20.85	16.93
20¾	22¾	9	41¼	13	32¼	21¾	129,200	296,300	Celanese Corp. Amer.	No	1,000,000	2.25	2.04	2.33	1.99
84	94	82	115	90	116	106	650	850	prior pfd.	100	164,818	7.00	27.07	27.25	35.34
12¼	13¾	7⅛	25¾	8½	21¼	13	66,400	223,200	Colgate-Palm.-Peet	No	1,999,970	.50	—.35	1.40	1.36
95	95½	78	104½	95	106½	100	2,100	9,900	6% pfd.	100	248,197	6.00	3.21	17.13	16.79
92¾	98½	53¾	125¾	65	136½	94	7,200	36,900	Columbian Carbon	No	537,406	6.50	8.31	7.48	5.56
11¾	12¼	5¼	21¼	5	24⅝	14¼	94,800	364,700	Commercial Solvents	No	2,636,878	.60	.60	.85	1.02
68¼	69⅝	53	71½	50½	82½	63⅜	22,400	113,200	Corn Products	25	2,530,000	3.00	2.52	3.86	2.62
165½	167⅝	162	171½	153	170	158	400	3,200	7% cum. pfd.	100	245,738	7.00	32.96	46.76	33.97
37	39¼	25	76⅛	29½	63	42	6,990	15,540	Devoe & Rayn. A	No	95,000	3.25	4.05	4.49	2.89
135	140⅛	87⅞	159¼	79½	142¼	94⅜	11,300	51,600	Dow Chemical	No	945,000	3.35	4.17	4.48	3.29
126¾	132¾	90½	180⅛	98	184¾	133	87,500	535,800	DuPont de Nemours	20	11,041,437	6.25	7.37	7.54	5.04
116¼	117	109½	112	107½	...	...	4,300	20,400	4½% pfd.	No	500,000	4.50	165.48	.....	.....
135	137	130¾	135½	130	136½	129	1,800	9,500	6% cum. deb.	100	1,092,948	6.00	81.70	84.21	56.81
177	181	121½	198	144	185	156	18,500	101,800	Eastman Kodak	No	2,250,921	7.50	9.76	8.23	6.90
169	171	157	164	150	166	152	300	1,760	6% cum.	100	61,657	6.00	362.45	306.64	258.09
29	30¼	19⅞	32¼	18	35⅛	23½	31,700	140,900	Freeport Texas	10	796,380	1.50	3.30	2.43	1.78
11	12⅛	6¾	19	8½	18	9½	6,500	43,400	Gen. Printing Ink	1	735,960	1.20	1.32	1.32	.97
23½	27¼	13	51½	19⅛	55¼	39½	34,100	120,100	Glidden Co.	No	799,701	2.60	2.62	3.29	2.74
46⅛	51½	37	58⅛	43	56	52¼	1,100	4,900	4½% cum. pfd.	50	199,940	2.25	12.72	15.43	13.23
98	98	76¼	117½	80⅜	133	99⅜	800	8,200	Hazel Atlas	25	434,474	6.56	6.67	6.55	7.58
60⅛	65¼	42¾	92½	50	75	42	44,800	104,800	Hercules Powder	No	1,316,710	2.62	2.97	3.24	2.12
132	132½	126¾	135½	125	135	126	530	1,850	6% cum. pfd.	100	96,194	6.00	50.75	48.97	36.30
25½	26	14⅜	47½	15	41⅜	25⅝	44,000	131,000	Industrial Rayon	No	759,325	2.00	.34	2.24	1.00
24½	26½	15	64¼	20	48	37	10,000	40,900	Interchem.	No	289,058	2.00	1.44	3.02	2.21
88⅛	98	80	111½	92	112	107	230	1,550	6% pfd.	100	66,917	6.00	12.26	18.97	16.15
3⅜	3⅞	2	9⅛	2	5⅞	2⅞	12,500	68,600	Intern. Agricul.	No	438,048	....	.16	—1.55	—.99
27½	29	15	63½	18¼	47¼	22¾	4,700	21,200	7% cum. pr. pfd.	100	100,000	3.00	7.70	.23	2.69
0½	52¾	36⅞	73⅜	37	66⅜	43¼	272,100	1,555,300	Intern. Nickel	No	14,584,025	2.25	3.31	2.40	1.65
23½	24¾	19½	28¾	19½	30	23	1,500	7,800	Intern. Salt	No	240,000	1.75	2.17	1.70	1.32
22½	24	19¾	36	19¼	36¾	29¼	2,900	5,900	Kellogg (Spencer)	No	500,000	1.60	2.81	2.62	2.22
45¼	48	23½	79	33⅜	80¼	47½	50,000	192,900	Libbey Owens Ford	No	2,506,117	4.00	4.19	4.14	3.26
19	21½	12⅛	26⅞	14	46½	32½	21,700	61,400	Liquid Carbonic	No	700,000	2.75	2.37	1.58	1.29
28¼	30½	19¾	41¾	22	42¾	27½	9,500	40,200	Mathieson Alkali	No	828,191	1.65	1.81	1.76	1.44
89⅜	94½	67	107½	71	103	79	23,400	121,100	Monsanto Chem.	No	1,114,388	3.00	4.40	4.01	3.45
113½	116	111	109	105	...	...	9,580	10,130	4½% pfd.	No	50,000	4.50	99.98	.....	.....
26	31	17⅛	44	18	36½	26¾	95,200	323,700	National Lead	10	3,098,310	.50	.95	1.71	1.08
160½	160½	154	171	153	171	155	300	2,100	7% cum. "A" pfd.	100	243,676	7.00	22.86	33.83	25.40
136	137	127	150	127	147	137¾	390	1,790	6% cum. "B" pfd.	100	103,277	6.00	43.77	74.50	49.05
17¾	19½	9⅞	41¾	10½	40	9	142,600	562,600	Newport Industries	1	519,347	.50	2.22	.98	.57
72	74⅛	40	103¾	51¼	82	64	36,700	186,100	Owens-Illinois Glass	12.50	2,661,204	4.00	3.51	3.80	2.09
54¼	56½	39½	65½	43¾	56	40¼	28,300	124,700	Procter & Gamble	No	6,325,087	2.75	4.08	2.39	2.23
118½	122¼	116	118½	114½	122½	115¾	570	5,230	5% pfd.	100	169,517	5.00	157.05	94.14	88.15
17½	18⅜	10	34¾	14⅞	28¾	14¾	44,600	144,800	Shell Union Oil	No	13,070,625	1.00	1.44	1.35	.37
104⅝	104⅝	93	105⅜	91	127½	102	3,300	16,300	5½% cum. pfd.	100	379,798	5.00	60.59	57.20	17.92
30¼	34¾	18½	60⅝	26½	47⅜	19½	41,200	113,100	Skelly Oil	No	1,006,348	1.50	6.07	4.42	2.17
92½	93	84	102¼	88	132	97⅜	200	2,500	6% cum. pfd.	100	66,300	6.00	97.86	73.16	39.00
34	35½	24¾	50	26½	48½	32¾	71,100	324,600	S. O. Indiana	25	15,235,323	2.30	3.06	3.09	1.98
57	58⅜	39¾	76	42	70⅜	51⅜	178,300	768,900	S. O. New Jersey	25	26,224,767	2.50	5.64	3.73	2.39
7½	8	3⅞	15⅜	5¼	13	5⅜	23,500	96,200	Tenn. Corp.	5	853,696	.35	1.09	.41	.22
47¼	49⅜	32⅝	65⅛	34¾	55¼	28⅞	186,500	774,800	Texas Corp.	25	11,386,253	2.25	5.02	4.10	1.57
35⅜	35⅞	26	44	23¾	44¾	33	34,000	226,600	Texas Gulf Sulphur	No	3,840,000	2.75	3.02	2.57	1.94
83¼	87	57	111	61¼	105¼	71⅝	109,000	593,100	Union Carbide & Carbon	No	9,000,743	3.20	4.75	4.09	3.06
61¾	65½	39	91	36¾	96¾	68	10,200	51,800	United Carbon	No	397,885	4.50	5.30	5.54	4.71
20¾	24¼	13½	43⅝	16⅛	59	31¼	20,800	83,200	U. S. Indus. Alcohol	No	391,238	....	1.24	—.20	2.16
19½	21⅜	11½	39⅜	9¼	30⅝	16¼	45,000	194,600	Vanadium Corp. Amer.	No	376,637	1.00	2.22	.40	—1.13
17⅜	17¾	14	...	...	...	...	1,900	6,600	Victor Chem.	5	696,000	1.12	1.01	1.16	1.13
4¾	5⅜	2¾	12¼	2⅜	8½	4⅛	22,800	125,500	Virginia-Caro. Chem.	No	486,708	....	—.05	—2.44	—.79
28	32⅛	15¾	74⅜	18½	58¾	28¾	18,700	95,500	6% cum. part. pfd.	100	213,392	1.50	5.88	.44	4.20
19	20⅛	10	27¼	10¾	32	19¾	7,300	20,800	Westvaco Chlorine	No	339,362	1.00	1.46	1.17	1.37
29⅜	30	20	34⅞	21⅛	35¼	31¾	1,800	13,700	cum. pfd.	30	192,000	1.50	4.09	3.26	3.22
NEW YORK CURB EXCHANGE															
24⅛	26⅝	15½	37	17⅝	40¾	29¼	69,200	283,200	Amer. Cyanamid "B"	10	2,520,368	.60	2.09	1.77	1.61
71	82	50	124	69	116¼	99¾	525	2,125	Celanese, 7% cum. 1st pfd.	100	148,179	7.00	22.32	24.47	21.96
4⅛	4½	3	15	3	16½	9	2,300	6,700	Celluloid Corp.	15	194,952	....	—.92	—.80	—.95
9	12	8¼	14⅝	10½	15	11⅞	100	900	Courtaulds' Ltd.	£1	24,000,000	9½%	8.64%	8.30%	7.51%
7½	9⅞	6	10⅝	3½	10¾	5	1,300	12,000	Duval Texas Sulphur	No	500,000	....	.43	.61	.16
35¾	37½	27	47½	31	55	39	1,100	3,600	Heyden Chem. Corp.	100	150,000	2.50	3.94	3.56	3.22
102¼	106¾	55	147½	77	140	98¼	13,400	65,600	Pittsburgh Plate Glass	25	2,142,443	6.50	8.53	7.15	5.32
109	115	66	154¾	72¼	154½	117	8,000	45,850	Sherwin Williams	25	633,927	6.00	8.44	8.04	6.19
111	111½	107	114	106¼	116	110	240	1,430	5% cum. pfd.	100	137,139	5.00	44.01	41.44	33.17
PHILADELPHIA STOCK EXCHANGE															
154	160	121½	179	115	179	114¾	375	2,675	Pennsylvania Salt	50	150,000	8.75	11.79	8.57	5.94

July Last	1938 High	1938 Low	1937 High	1937 Low	1936 High	1936 Low	Sales	Bonds	Date Due	Int. %	Int. Period	Outstanding $
NEW YORK STOCK EXCHANGE							July 1938	1938				
103¾	105⅜	99⅛	109½	99	117½	107¾	408,000	1,869,000	Amer. I. G. Chem. Conv.	1949	5½ M-N	$25,300,000
37	37½	25⅛	42½	23	42½	27½	129,000	1,275,000	Anglo Chilean Nitrate inc. deb.	1967	4½-5 J	12,067,000
105½	106	102⅜	102⅞	100⅜	...	...	49,000	306,000	Dow Chemical	1951	3 J-D	5,000,000
101⅛	102	100	102	98½	102¾	96¾	22,000	158,000	Int. Agric. Corp. 1st Coll. tr. stpd. to 1942	1942	5 M-N	5,633,000
34	34	24¾	35⅜	21¼	39	21	233,000	1,238,000	Lautaro Nitrate n inc. deb.	1975	4 J-D	30,500,000
23	23	20½	25½	20½	35	23½	1,000	22,000	Ruhr Chem.	1948	6 A-D	1,500,000
104	104	96½	102	93	101¼	94¼	379,000	3,329,000	Shell Union Oil	1951	3½ M-S	58,800,000
102¾	103	90¼	102¾	94	102⅞	96⅝	173,000	1,336,000	Skelly Oil	1951	4 J-J	9,000,000
102¼	102½	95	105	93½	105	103	29,000	167,000	Tenn. Corp. deb. "B"	1944	6 M-S	1,600,000
106⅞	107	103½	105¾	100	106	101½	285,000	2,348,000	Texas Corp.	1951	3½ J-D	60,000,000
98⅜	99	77	111	81	98½	85¾	84,000	310,000	Vanadium Corp. conv.	1941	5 A-O	2,800,000

* Paid in 1937, including extras but excluding dividends paid in stock. ** For either fiscal or calendar years.

Official Chemical Specialty Specifications, p. 1

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Note: For a list of Official Chemical Specifications see Statistical and Technical Data Section, Vol. 42, Part 2, p. 127.

U. S. War: Issued by War Department which has adopted Federal Specifications (see above), and special departmental specifications, indicated in the second column as follows:

Q: Quartermasters Corps, U.S.A., Washington, D. C.
M: Medical Dept., U.S.A., Washington, D. C.
E: Corps of Engineers, U.S.A., Washington, D. C.
S. Signal Corps, U.S.A., Washington, D. C.
CW: Chemical Warfare Service, U.S.A., Edgewood Arsenal, Maryland.
A: Air Corps, U.S.A., Dayton, Ohio.
CA: Coast Artillery Corps, U.S.A., Washington, D. C.

U. S. Navy: Bureau of Supplies and Accounts, Navy Department, Washington, D. C.

N. Y. City: Dept. Purchases, Municipal Bldg., Manhattan.

PRODUCT	A. S. T. M.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Asphalt, cut back for road work	.....	SS-A-671	SS-A-671		SS-A-671	24-A-23
Emulsion for road work	.....	SS-A-674	SS-A-674		SS-A-674	24-A-22A
For built-up roofing, waterproofing and dampproofing	.....	.....	SS-A-666		.....	.....
For use in mfr. fiber containers	.....	.....	3-160	O	.....	.....
For use in road and pavement constructior	.....	SS-A 706	SS-A-706		SS-A-706	24-A-6
Petroleum, type PAF-1-25 for joint filler, squeegee or pouring method	.....	SS-A-696	SS-A-696		SS-A-696	24-A-21A
Primer, for roofing and waterproofing	D169-25	SS-A-701	SS-A-701		.....	.....
Asphaltum, lump	.....	.....	42.2-5	E	.....	.....
Venetian	.....	.....	42.2-3	E	.....	.....
Washout solution	.....	.....	42.2-2	E	.....	.....
Bath Salts for heating metals	.....	.....	.....		51B4	.....
Bituminous Grout, below ground level	D171-25	.....	.....		.....	.....
Above ground level	D170-25	.....	.....		.....	.....
Bituminous materials suitable for road treatment, distillation	.....	.....	44-1A	Q	.....	.....
Bluing; Laundry	.....	O-B-491	O-B-491		.....	.....
Cement, airship rubber	.....	.....	20-37C	A	.....	.....
Aluminized rubber	.....	.....	20-36A	A	.....	.....
Asphaltic	.....	.....	.....		.....	.....
Balloons and airships	.....	.....	.....		.....	.....
Bituminous, plastic	.....	SS-C-153	SS-C-153		.....	24-A-7B
Cold patching, liq.	.....	ZZ-C-191	ZZ-C-191		.....	.....
Colored, for marking	.....	.....	20-7	A	.....	.....
Compound, iron or steel	.....	.....	.....		51-C-3C	.....
Fire, hot & cold set	.....	.....	.....		32C10	.....
Kaolin, pipe thread	.....	.....	97-54-44	C	.....	.....
Keene's	C61-30	SS-C-161	SS-C-161		SS-C-161	.....
Linoleum	.....	.....	.....		52C5a	.....
Liquid for tent patches	.....	.....	3-121A	Q	.....	.....
Masonry	.....	SS-C-181a	SS-C-181A		SS-C-181a	.....
Pittman	.....	.....	50-11-8A	O	.....	.....
Portland	C-9-30	SS-C-191a	SS-C-191		SS-C-191a	24-C-23B
Portland, high early strength	C74-36	SS-C-201	.....		SS-C-201	.....
Portland, moderate heat of hardening	.....	SS-C-206	.....		SS-C-206	.....
Portland, sulfate resisting	.....	SS-C-211	.....		SS-C-211	.....
Rubber	.....	.....	20-29B	C	52C3a	.....
Rubber, non-hardening	.....	.....	.....		52C10	.....
Silica	.....	HH-C-176	HH-C-176		32C8a	.....
Chemicals for dopes	.....	.....	4-24	A	.....	.....
Cleaning of aircraft surfaces prior to application of initial protective coating	.....	.....	98-2007	A	.....	.....
Colors, for Army Air Corps airplanes	.....	.....	98-24113	A	.....	.....
Flag of the U. S.	.....	TT-C-591	TT-C-591		TT-C-591	.....
Insignia, in oil, semipaste	.....	.....	3-120C	A	.....	.....
Water	.....	.....	26-6	Q	.....	.....
Compound, Adhesive, waterproof	.....	.....	50-11-48	O	.....	.....
Battery-sealing	.....	.....	.....		17C12	.....
Boiler, Navy '33	.....	.....	.....		13C3g	.....
Boiler (briquetted)	.....	.....	.....		.....	5-C-2:37T
Cable pulling	.....	.....	71-590	S	.....	.....
Carburizing	.....	.....	.....		51C14	.....
Cleaning, for painted surfaces	.....	.....	.....		51C205	.....
Cleaning, fuel-oil tank	.....	.....	.....		51C19	.....
Cyanide	.....	.....	.....		51C15	.....
Joint sealing for liquid-cooled engines	.....	.....	2-86	A	.....	.....
Metal conditioning	.....	.....	.....		14C5a	.....
Plumbing fixture setting	.....	HH-C-536	HH-C-536		HH-C-536	.....
Polishing	.....	.....	.....		51C18a	.....
Rust preventive, heavy	.....	.....	2-82B	O	14C4b	.....
Rust preventive, medium	.....	.....	2-84A	O	14C4b	.....
Sealing, aircraft instrument	.....	.....	2-87	A	.....	.....
Sweeping	.....	P-C-591	P-C-591		P-C-591	.....

Official Chemical Specialty Specifications, p. 1

Official Chemical Specialty Specifications, p. 2

PRODUCT	A. S. T. M.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Compound (Continued)						
Waterproofing	.....	.....	50-11-76	O	.....	.....
Waterproofing for fabrics	.....	.....	3-138	A	.....	.....
Zinc-coating	.....	.....	.....		52C11	.....
Cotton fabric woven, coal-tar saturated	.....	.....	HH-C-591		.....	.....
Detergents	.....	.....	.....		.....	5-S-22:36T
Detergent, hand, paste and powder	.....	P-D-221	P-D-221		.....	.....
Dope, airship and balloon	.....	.....	3-139	A	49D1	.....
Cellulose acetate	.....	.....	3-110D	A	.....	.....
Cellulose nitrate	.....	.....	3-151A	A	.....	.....
Clear nitrate (air corps form.)	.....	.....	3-161	A	.....	.....
Pigmented nitrate	.....	.....	3-109D	A	.....	.....
Semipigmented nitrate (air corps. form.)	.....	.....	3-159A	A	52D3a	.....
Doping aircraft surfaces	.....	.....	98-24100T	A	.....	.....
Drier, paint liquid	.....	TT-D-651	TT-D-651		TT-D-651	.....
Dye, Aniline	.....	.....	75-14	S	.....	.....
Green, for cartridge cloth	.....	.....	27-3	O	.....	.....
Liquid-coloring, fire extinguisher	.....	.....	.....		51D2	.....
Scarlet, for igniter pads	.....	.....	27-2	O	.....	.....
Enamel (and primer) bituminous	.....	.....	.....		52P17	.....
For aircraft	.....	.....	3-98C	A	.....	.....
Heat resistant for coatings	.....	.....	3-135	A	.....	.....
Heat resistant for coatings of alum. and mag. alloys	.....	.....	.....		.....	.....
Interior gloss, light tints and white	.....	TT-E-506	TT-E-506		TT-E-506	.....
Olive drab	.....	.....	3-97	Q	.....	.....
Pigmented, air-drying and baking black	.....	TT-E-521	TT-E-521		.....	.....
Water-resisting, red	.....	TT-E-531a	TT-E-531A		.....	.....
White	.....	.....	.....		.....	.....
Eosin Y, color index no. 768	.....	.....	O-E-571		.....	.....
Extracts, flavoring, and flavors, nonalcoholic	.....	.....	EE-E-911		EE-E-911	.....
Facings, foundry, carbon-base	.....	SS-F-111	SS-F-111		SS-F-111	.....
Felt, asphalt-saturated, for flashings, roofing, etc.	.....	HH-F-191	HH-F-191		HH-F-191	.....
Coal-tar saturated, for roofing and waterproofing	D227-27	HH-F-201	HH-F-201		HH-F-201	.....
Filler, wood, liquid	.....	.....	3-90	Q	52F1c	.....
Wood, paste	.....	TT-F-336	TT-F-336		TT-F-336	.....
Fire extinguishing liq., carbon tetrachloride base	.....	O-F-380	O-F-380		O-F-380	13-F-1:37T
Flare aircraft M9	.....	.....	50-55-2	O	.....	.....
Fluid, marking (aircraft use)	.....	.....	.....		53F6	.....
Flux, brazing (silver)	.....	.....	.....		51F4	.....
Nonacid	.....	.....	83-12	O	.....	.....
Soldering (paste)	.....	.....	.....		51F1b	.....
Welding	.....	.....	.....		51F2b	.....
Welding, for corrosion and heat resisting steel	.....	.....	.....		51F3	.....
Fungicides, Oil, Misc. dormant	.....	.....	.....		.....	5-F-1:36T
Spray	.....	.....	.....		.....	5-F-2:37T
Kerosene emulsion	.....	.....	.....		.....	5-F-3:37T
Lime sulfur sol	.....	.....	.....		.....	.....
Glue, animal, for woodworking	.....	C-G-451	C-G-451		C-G-451	.....
Aviation, marine, waterproof	.....	.....	3-153	A	52G10	.....
Casein, water-resistant	.....	.....	3-152A	A	52G8b	.....
For use in loading ammunition	.....	.....	3-102A	O	.....	.....
For manufacture of primers	.....	.....	3-118	O	.....	.....
Liquid	.....	.....	.....		52G1b	.....
Liquid, photo-engravers	.....	.....	42-4	Q	.....	.....
Marine (ship)	.....	.....	.....		52G6c	.....
Graphite, lubricating, amorphous	.....	.....	.....		14G4b	.....
Lubricating, flake	.....	.....	.....		14G3e	.....
Grease, axle	.....	.....	2-54	Q	.....	.....
For recoil mechanisms	.....	.....	2-39C	Q	.....	.....
Lubricating, crank pin and rod cup	.....	.....	V-V-G-651		.....	.....
Driving journal	.....	VV-G-661	V-V-G-661		.....	.....
Graphite	.....	VV-G-671	V-V-G-671		14G2g	.....
Mineral	.....	VV-G-681	V-V-G-681		14G1g	.....
Shell	.....	.....	50-11-37	O	.....	.....
(Methods of analysis)	D128-27	.....	.....		.....	.....
Inhibitors, pickling	.....	.....	.....		51I2	.....
Ink, autographic	.....	.....	42.2-28	E	.....	.....
Black, for wooden boxes	.....	.....	36-3	O	.....	.....
Bottle, hard-rubber	.....	.....	20-90	M	.....	.....
Copying and record	.....	TT-I-521	TT-I-521		.....	.....
Drawing, waterproof, colored	.....	TT-I-531	TT-I-531		TT-I-531	.....
Drawing, black	.....	TT-I-528	TT-I-528		TT-I-528	.....
Etching	.....	.....	42.2-29	E	.....	.....
Hand press, black	.....	.....	42.2-30	E	.....	.....
Hectograph, var. colors	.....	.....	42.2-31	E	.....	.....
Marking	.....	.....	94-40094	A	.....	.....
Marking, indelible, for fabrics	.....	.....	TT-I-542		.....	.....
Printing, black and white	.....	.....	36-2	O	.....	.....
Printing, bright vermilion	.....	.....	42.2-38	E	.....	.....
Red	.....	TT-I-549	TT-I-549		TT-I-549	.....
Stamp-pad	.....	TT-I-556	TT-I-556		TT-I-556	.....
Writing	.....	TT-I-563	TT-I-563		TT-I-563	.....

Official Chemical Specialty Specifications, p. 3

PRODUCT	A. S. T. M.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Insect powder (pyrethrum)	.....	.....	O-P-571		.....	.....
Insecticides: Lead arsenate (paste)	.....	.....	.....		.....	5-1-1:36T
Sulfur, powd., sol.	.....	.....	.....		.....	5-1-2:36T
Liquid	.....	.....	.....		.....	5-1-3:36T
Powdered (calcium arsenate, lead arsenate, Paris green, Bordeaux mixture)	.....	.....	.....		.....	5-1-4:37T
Insulating compound, 30% rubber, for wire, etc.	.....	.....	71-134D	S	.....	.....
Type IC-I	.....	.....	71-449	S	.....	.....
Insulating material, electrical	.....	.....	.....		17I16	.....
Insulation, loose fill, mineral wool and gypsum	.....	HH-I-521a	HH-I-521a		.....	.....
Lacquer	.....	.....	3-86A	Q	.....	.....
Cellulose nitrate	.....	.....	3-158	A	.....	.....
Enamel	.....	.....	3-150	Q	.....	.....
Enamel nitrocellulose and thinner, for ammunition	.....	.....	3-162	O	.....	.....
For landing light reflectors	.....	.....	3-163	A	.....	.....
Lacquer, shellac	.....	.....	3-148	Q	.....	.....
Lead, caulking	.....	QQ-L-156	QQ-L-156		QQ-L-156	34-L-1
Red, asbestine paint	.....	.....	3-52	Q	.....	.....
Liquid dipping and spraying	.....	.....	3-87	Q	.....	.....
Lubricant, ball and roller bearing	.....	.....	.....		14L3b	.....
Chain and wire rope	.....	VV-L-751	VV-L-751		VV-L-751	.....
Gear	.....	.....	.....		14L4	.....
Transmission and differential, graphite	.....	.....	2-68	Q	.....	.....
Waterproof	.....	.....	.....		14L5	.....
Mineral filler, var. purposes	.....	SS-M-351	SS-M-351		.....	.....
Mold-wash, silica	.....	.....	SS-M-501a		SS-M-501a	.....
Mucilage	.....	SSS-M-791	SSS-M-791		SSS-M-791	.....
Oil, clock and watch	.....	.....	2-47A	Q	.....	.....
Car and locomotive engine	.....	.....	2-60C	Q	.....	.....
Class D, for internal combustion engines other than aircraft and Diesel	.....	VV-O-496	VV-O-496		.....	.....
Cutting, mineral lard	.....	VV-O-251	VV-O-251		VV-O-251	30-O-10Q
Cutting, mineral lard, sulfur treated	.....	.....	.....		14O11	.....
Cutting, soluble	.....	VV-O-261	VV-O-261		VV-O-261	.....
Diesel engine	.....	VV-O-511	VV-O-511		.....	.....
Electric switch	.....	.....	2-17C	Q	.....	.....
Floor	.....	.....	2-35C	Q	.....	.....
For hydraulic variable speed gears	.....	.....	2-79	O	.....	.....
Lubricating, aircraft engine	.....	.....	2-91	A	.....	.....
Lubricating, machine gun	.....	.....	2-27C	A	.....	.....
Marine engine, compounded	.....	VV-O-541	VV-O-541		.....	.....
Marine engine, mineral	.....	VV-O-551	VV-O-551		.....	.....
Recoil	.....	.....	2-36C	O	.....	.....
Recoil, for aircraft machines	.....	.....	2-77	O	.....	.....
Recoil, heavy, low pour pt.	.....	.....	2-96	O	.....	.....
Refrigerating machine	.....	VV-O-581	VV-O-581		.....	.....
Road, type OH-1-25, hot application	.....	.....	VV-O-751		VV-O-751	.....
Rocker arm, grade 3000	.....	.....	2-88	A	.....	.....
Steam cylinder, compounded	.....	VV-O-601	VV-O-601		.....	.....
Steam cylinder, mineral	.....	VV-O-611	VV-O-611		.....	.....
Tempering	.....	.....	2-80	O	.....	.....
Transformer	.....	.....	2-72	Q	14O12	.....
Transmission	.....	.....	2-28D	Q	.....	.....
Turbine	.....	VV-O-661	VV-O-661		.....	.....
Packing, metallic and nonmetallic plastic	.....	HH-P-131a	HH-P-131a		.....	.....
Paint, acid-proof black	.....	.....	3-106C	O	.....	.....
Aluminum Bronze Powd. Dry	.....	.....	.....		.....	31-P-30
Anticorrosive	.....	.....	3-74	Q	.....	31-P-42
Antifouling	D227-31	.....	3-75	Q	.....	31-P-43
Black, carbon, dry and in oil	.....	.....	3-30A	Q	.....	.....
Black drop, dry, in oil and Japan	.....	.....	3-31B	Q	.....	.....
Black target	.....	.....	3-128	O	.....	.....
Blue	.....	.....	3-105	C	.....	.....
Camouflage, black	.....	.....	3-66A	Q	.....	.....
Camouflage, other colors	.....	.....	3-65	Q	.....	.....
Cantonment, etc.	.....	.....	3-70	Q	.....	.....
Cold water, casein binder	.....	TT-P-21	TT-P-21		TT-P-21	31-P-70:36T
Cold water, exterior	.....	.....	3-64	Q	52P1d	.....
Copper	.....	.....	3-73	Q	.....	.....
Deck, floor, porch, etc.	.....	.....	3-111A	Q	.....	.....
Dope-proof	.....	.....	3-107D	A	.....	.....
Dry pigment, cement and concrete	.....	.....	.....		.....	31-P-60
Enamel and undercoating	.....	.....	.....		.....	31-P-50
Enamel (syn. resin)	.....	.....	.....		.....	31-P-57
Enamel, interior, white or tinted	.....	.....	.....		.....	31-P-72:37T
Enamel, black synthetic	.....	.....	.....		.....	31-P-64
Enamel, olive drab, synthetic	.....	.....	.....		.....	31-P-65
For ammunition	.....	.....	3-67B	O	.....	.....
Flag blue	.....	.....	3-47A	Q	.....	.....
Graphite, ready-mixed, black	.....	.....	3-49A	Q	.....	31-P-29A
Green, dark chrome green	.....	.....	.....		.....	31-P-26A
Flat, interior	.....	.....	.....		.....	31-P-71:37T

Official Chemical Specialty Specifications, p. 4

PRODUCT	A. S. T. M.	U. S. Federal	U. S. War		U. S. Navy	N. Y. City
Paint (Continued)						
Floor enamel	.....	.....	.....		.....	31-P-69
Green, limeproof dry and in oil	.....	.....	3-34A	Q	.....	.....
Green (Dock Dept.)	.....	.....	.....		.....	31-P-31
Hanger, gray and green	.....	.....	3-71	Q	.....	.....
Helmet	.....	.....	3-56	Q	.....	.....
Iron-hydroxide and iron-oxide, ready mixed and semi-paste	.....	TT-P-31	TT-P-31		TT-P-31	.....
Lacquer enamel	.....	.....	.....		.....	31-P-59
Lead-zinc base, ready mixed and semi-paste, white and tinted	.....	TT-P-36	TT-P-36		TT-P-36	31-P-74:37T
Lithopone	.....	.....	3-41	Q	.....	.....
Oil, interior, eggshell finish, ready mixed and semi-paste, light tints and white	.....	TT-P-51	TT-P-51		TT-P-51	.....
Olive drab	.....	.....	3-55	Q	.....	.....
Priming plastic surfaces	.....	TT-P-56	TT-P-56		TT-P-56	.....
Projectile, black	.....	.....	3-68	Q	.....	.....
Quick-drying, olive-drab or dark gray	.....	.....	3-72	Q	.....	.....
Ready-mixed and semi-paste, black	.....	TT-P-61	TT-P-61		TT-P-61	.....
Ready-mixed, green	.....	TT-P-71	TT-P-71		TT-P-71	.....
Ready-mixed, olive-drab	.....	TT-P-81	TT-P-81		TT-P-81	.....
Red, Indian, dry, in oil and in Japan	.....	.....	3-35B	Q	.....	.....
Red, Venetian, dry, in oil, and in Japan	.....	.....	3-37B	Q	.....	.....
Red, toluidine red lake ground in Japan (paste)	.....	.....	.....		.....	31-P-27
Red (ready mixed red lead)	.....	.....	.....		.....	31-P-28
Rivet-marking	.....	.....	.....		52P6	.....
Stencil, black	.....	.....	3-50	Q	.....	.....
Stencil, white	.....	.....	3-61	Q	.....	.....
Target	.....	.....	3-128	Q	.....	.....
Target, white	.....	.....	3-60	Q	.....	.....
Titanium, zinc, outside, ready mixed and semi-paste, white	.....	TT-P-101a	TT-P-101a		TT-P-101a	.....
Tree	.....	.....	.....		.....	31-P-73:37T
Vermilion	.....	.....	3-53	Q	.....	.....
White, undercoat gloss	.....	.....	.....		.....	31-P-22
White (interior lithopone paste)	.....	.....	.....		.....	31-P-24
White, traffic	.....	.....	.....		.....	31-P-62
White lead	.....	.....	3-129	Q	.....	31-P-53:36T

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Pigments, Fillers, 1936-37

Carbon Black, Lead & Zinc Pigments, China Clay—p. 1

Carbon Black in '37

Advances in production and total sales, and a slump in prices the latter part of the year were important developments recorded by the carbon black industry in 1937, states the Bureau of Mines. Production was 510,606,000 lbs., a gain of 24% over the previous peak of 1936. A decline in sales the latter part of the year, due to a slowing up in the rubber trade, resulted in an increase of stocks held by producers. There were 100,497,000 lbs. of carbon black on hand at the end of 1937 compared with 79,582,000 lbs. at the close of 1936.

Spot prices, which had remained remarkably steady since the code, weakened abruptly the latter part of the year. For example, the most representative spot price was 4.45c per lb. throughout the year until Nov. 8 when a cut of 0.50c was made. Several other cuts followed, so that this price at the close of the year was only 3.20c per lb. Average value at the plants as reported by the producers dropped from 3.92c in '36 to 3.41c in '37, but the average export value advanced from 4.69c in '36 to 4.72c in 1937.

Rise in Production

Gains in production were registered by all the producing states. The Texas Panhandle again accounted for nearly 80% of the total production. Kansas entered the field for the first time with a plant in Grant County. There were 57 carbon black plants operated in 1937, compared with 54 in 1936. A loss of 3 plants in Louisiana was more than offset by a gain of 5 plants in Texas and one in Kansas. Ward and Winkler Counties, Texas, showed production for the first time, while Moore County (Panhandle) materially increased its output with four new plants.

There were 341,085,000,000 cu. ft. of natural gas burned at carbon black plants in '37, compared with 283,421,000,000 in '36, or about 14% of the estimated gas consumption in the U. S. in '37, compared with 13% in '36.

Average yield of carbon black per thousand cu. ft. of natural gas rose from 1.45 lbs. in '36 to 1.50 lbs. in '37, the largest gain ever recorded for any single year. This increase reflects a gain in the relative importance of "other" processes, one or two of which recover up to 10 lbs. per thousand cu. ft. burned.

Sales of carbon black by the producers rose from 467,736,000 lbs. in '36 to 489,615,000 lbs. in '37. Exports increased from 154,718,000 lbs. in '36 to 184,030,000 lbs. in '37, hence domestic sales decreased from 313,018,000 lbs. in '36 to 305,585,000 lbs. in '37. Domestic sales were divided as follows: To rubber companies, 269,807,000 lbs. (88%); to ink companies, 18,116,000 lbs. (6%); to paint companies, 6,159,000 lbs. (2%); for miscellaneous purposes, 11,503,000 lbs. (4%). These data indicate losses in the rubber and paint trades, gains for ink and miscellaneous uses.

United Kingdom continued to be the principal foreign customer followed by France, Germany, and Canada in the order named. Although the continued rise in export was one of the few bright spots in the industry in '37, a material part of this trade was based on military activities of uncertain duration.

Carbon Black Industry 1936, 1937

(Preliminary)

	1936	1937
Number of producers reporting	20	24
Number of plants	54	57
Quantity produced (pounds):		
Louisiana	59,201,000	66,381,000
Texas:		
Panhandle	321,576,000	405,247,000
Rest of State	12,330,000	15,821,000
Total Texas	333,906,000	421,068,000
Other States	18,238,000	23,157,000
Total United States	411,345,000	510,606,000
Produced by:		
Channel process (pounds)	366,876,000	444,427,000
Other processes[1] (pounds)	44,469,000	66,179,000
Stocks held by producers Dec. 31 (pounds)	79,582,000	100,497,000
Sales (pounds):		
Domestic:		
To rubber companies	278,018,000	269,807,000
To ink companies	17,787,000	18,116,000
To paint companies	6,914,000	6,159,000
For miscellaneous purposes	10,299,000	11,503,000
Total	313,018,000	305,585,000
Exports:		
United Kingdom	46,957,000	48,278,000
France	26,748,000	29,877,000
Germany	16,225,000	27,439,000
Other	64,788,000	78,436,000
Total	154,718,000	184,030,000
Losses (pounds)	113,000	76,000
Value (at plants) of carbon black produced:		
Total (dollars)	16,110,000	17,389,000
Average per pound (cents)	3.92	3.41
Estimated quantity of natural gas used (M cubic feet)	283,421,000	341,085,000
Average yield per M cubic feet (pounds)	1.45	1.50

[1] Roller, "special," thermatomic, and Lewis.

By G. R. Hopkins, Assistant Chief Economist, Petroleum Economics Division.

Lead & Zinc Pigments

The lead and zinc pigments industries shared in the improvement of industry in general during 1937 and showed greater total values of sales for both classes, but, unlike many commodities, neither class increased in total quantity. Lead pigments, as a whole, declined 9% in quantity, but increased 4% in value, while zinc pigments fell 5% in quantity and gained 1% in value, according to statistics compiled by the Bureau of Mines, Dept. of the Interior.

Prices for lead pigments followed the average price for pig lead, rising early in the year and declining as the year progressed to close the year at their lowest levels. Prices for lead-free zinc oxide, anticipating a higher slab zinc price, advanced in June ahead of the price for metal, and remained at the higher level in the latter part of the year despite the rapidly falling metal price.

Because of the increased popularity of leaded zinc oxide containing a higher lead content, sales of this pigment continued at approximately the peak level of 1936. The basic lead sulfate figures shown in this report are exclusive of the quantity used in the manufacture of leaded zinc oxide, which amounted to nearly 5,000 tons in 1937.

Litharge made a good showing in 1937, the quantity sold in that year being only 5% below the peak level in 1929. Sales of litharge to manufacturers of insecticides have increased rapidly in recent years, and they established a new high record in 1937.

Salient statistics on lead and zinc pigments and zinc salts are shown in the following tables. Data on zinc chloride are not available because of the refusal of one of the larger producers to supply reliable figures.

The lithophone producers report an annual production capacity of 231,000 tons.

Imports of lead pigments are negligible. Exports of white lead decreased from 1,862 tons in 1936 to 1,236 tons in 1937; those of red lead increased from 810 tons to 934 tons; and litharge from 1,386 to 1,452 tons.

Imports of zinc oxide fell from 790 tons in 1936 to 775 tons in 1937; while those for lithopone increased from 4,781 tons to 5,601 tons; and zinc sulfide from 30 to 113 tons. Imports of zinc chloride rose

Pigments, Fillers, 1936-37

Carbon Black, Lead & Zinc Pigments, China Clay—p. 2

from 520 tons to 667 tons and those of zinc sulfate from 385 to 593 tons.

Exports of zinc pigments improved in 1937. Shipments of zinc oxide from the country totaled 2,953 tons in 1937 compared with 1,330 tons in 1936, and shipments of lithopone were 2,671 tons compared with 2,538 tons.

China Clay in '37

Production of kaolin or china clay made another all-time record in 1937, advancing to 732,282 short tons, valued at $5,349,636, compared with 638,939 tons worth $4,537,738 in the preceding year. The 1937 tonnage, as reported by producers to the Bureau of Mines, tops the 1936 record by 15% and is 37% higher than that for 1930, the former peak year. Imports increased about 5%, amounting in 1937 to 146,523 tons with a foreign market value of $1,211,266, reflecting improvement in the manufacture of hotel china, sanitary ware, and electrical porcelain—industries that have not been so ready as other consuming industries in the United States to substitute the greatly improved domestic clays for English clays to which they have become accustomed after long years of use. Shipments of domestic potting clays for whiteware actually were a trifle less than in 1936, and smaller quantities of white clays were reported as used in paint and sundry other minor outlets, but sales of paper clays continued to grow, especially notable being the large increase in coating clays, thereby confirming the gratifying progress of certain domestic firms in their researches on super quality clays. Shipments of rubber clays for domestic and foreign consumption and those of refractory clays likewise expanded greatly.

Prices of high grade clays tended to grow firmer during the early months of 1937. Average sales realization for all domestic kaolin sales rose to $7.31 compared with $7.10 in 1936, but part of this increase resulted from the steady improvement in average quality rather than from any general mark-up in prices for specified grades. English clay schedules were revised, mostly upward, and transatlantic freight rates averaged higher.

Georgia as usual was the leading producing State, with 503,732 short tons, or 69% of the total, followed by South Carolina, with 129,120 tons, or 18% of the total output, and Pennsylvania, with 45,916 tons, or about 6% of the total kaolin. Other important producing States were Florida, Virginia, North Carolina and California. Since 1931 the total production of Georgia has included certain hard or so-called "flint kaolin" used mainly for refractory purposes.

Kaolin Sold by U. S. Producers 1936-37

(By uses, short tons)

Use	1936	1937
Pottery and stoneware:		
Whiteware, etc.	52,196	50,638
Chemical stoneware	....	....
Art pottery	407	200
Slip for glazing	....	....
	52,603	50,838
Tile, high-grade	13,955	17,012
Kiln furniture, etc.:		
Saggers, pins, stilts	2,220	1,522
Paper:		
Filler	322,970	335,031
Coating	57,056	91,146
Rubber	72,712	86,007
Linoleum and oilcloth	1,620	6,368
Paints:		
Filler or extender	10,429	5,343
Kalsomine	3,233	1,884
	13,662	7,227
Cement manufacture	26,304	32,788
Refractories:		
Firebrick and block	43,556	70,414
Fire-clay mortar	1,674	2,038
Glass pots	200	....
Other glass refractories	258	244
Foundries, steelworks	4,469	4,474
	50,157	77,170
Miscellaneous:		
Asbestos products	401	299
Chemicals	3,039	2,417
Enameling	30	82
Plaster and plaster products	3,675	3,674
Heavy clay products	2,338	1,535
Other Uses	16,197	19,166
	25,680	27,173
	638,939	732,282

Lead and Zinc Pigments and Zinc Salts sold by Domestic Manufacturers in the U. S., 1936-37

	1936 Short tons	1936 Value Total	1936 Value Per ton	1937 Short tons	1937 Value Total	1937 Value Per ton
Basic lead sulfate or sublimed lead:						
White	7,531	$ 863,268	$115	7,514	$ 973,214	$130
Blue	891	102,565	115	1,108	147,298	133
Red lead	34,896	4,657,322	133	33,931	5,429,182	160
Orange mineral	248	48,196	194	206	49,356	240
Litharge	86,246	9,966,563	116	83,902	12,033,949	143
White lead:						
Dry	34,775	4,367,337	126	32,661	4,576,337	140
In oil[1]	83,632	14,200,617	170	65,552	12,466,396	190
Zinc oxide	126,800	11,376,323	90	114,652	11,777,131	103
Leaded zinc oxide	40,512	3,508,673	87	40,343	4,190,952	104
Lithopone	158,319	12,976,754	82	154,771	12,069,790	78
Zinc sulfate	8,687	388,081	45	10,521	589,017	56

[1] Weight of white lead only, but value of paste.

Sales of Lead and Zinc Pigments, by Uses, 1936-37

	1936 Short tons	1937 Short tons
White lead (dry and in oil)		
Paints	113,363	93,580
Ceramics	2,653	2,506
Other	2,391	2,127
	118,407	98,213
Red lead		
Storage batteries	20,323	20,275
Paints	11,786	10,440
Ceramics	807	854
Other	1,980	2,362
	34,896	33,931
Orange mineral		
Ink manufacture	71	76
Color pigments	77	51
Other	100	79
	248	206
Litharge		
Storage batteries	[1]38,700	[1]32,228
Insecticides	14,662	18,242
Chrome pigments	8,407	8,689
Oil Refining	7,259	8,311
Ceramics	7,762	7,577
Varnish	2,307	1,865
Rubber	2,147	1,659
Linoleum	280	264
Other	4,722	5,067
	86,246	83,902

	1936 Short tons	1937 Short tons
Basic lead sulfate		
Paints	8,124	8,255
Rubber	126	213
Storage batteries	28	6
Other	144	148
	8,422	8,622
Lithopone		
Paint, varnish and lacquers	122,461	122,915
Floor coverings and textiles	23,085	20,194
Rubber	4,908	4,383
Other	7,865	7,279
	158,319	154,771
Zinc oxide		
Rubber	72,885	67,061
Paints	33,149	27,987
Floor coverings and textiles	7,178	9,019
Ceramics	6,102	5,216
Other	7,486	5,369
	126,800	114,652
Leaded zinc oxide		
Paints	40,156	39,584
Rubber	32	97
Other	324	662
	40,512	40,343

[1] In addition 41,000 tons of black or grey oxide in 1936 and 42,000 tons in 1937 were produced by the makers of storage batteries in their own plants.

Georgia Kaolin Sold or Used, 1933-37

(By uses)	China clay, paper clay, etc.			Refractory uses			Total kaolin		
Year	Short tons	Value Total	Value Ave. per ton	Short tons	Value Total	Value Ave. per ton	Short tons	Value Total	Value Ave. per ton
1933	239,271	$1,342,512	$5.61	40,767	$75,108	$1.84	280,038	$1,417,620	$5.06
1934	236,606	1,535,046	6.49	47,950	86,177	1.80	284,556	1,621,223	5.70
1935	298,275	2,251,785	7.55	41,383	95,192	2.30	339,658	2,346,977	6.91
1936	367,463	2,764,065	7.52	51,932	131,813	2.54	419,395	2,895,878	6.90
1937	423,065	3,332,851	7.88	80,667	213,208	2.64	503,732	3,546,059	7.04

U. S. Chemical Patents

Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 41

Agricultural Chemicals

Production crystalline monocalcium phosphate of low content of free phosphoric acid and dicalcium phosphate. No. 2,121,208. Chas. H. Milligan, Westfield, N. J., to American Agricultural Chemical Co., Newark, N. J.

Manufacture calcium arsenate by addition of an aqueous arsenic acid solution to an aqueous slurry of calcium hydroxide. No. 2,122,861. Arthur M. Henninger, Floral Park, N. Y., to General Chemical Co., New York City.

Method treating calcium arsenate containing excess lime to reduce its injurious effects on living plants. Nos. 2,123,190-1. John F. Les Veaux to Niagara Sprayer & Chem Co., both of Middleport, N. Y.

Manufacture insecticidal calcium arsenate for controlling normally occurring insect pests on tender growing plants. No. 2,123,192. John F. Les Veaux to Niagara Sprayer & Chemical Co., both of Middleport, N. Y.

Cellulose

Cellulose ether recovery. Nos. 2,121,731-2. Wm. R. Collings to Dow Chemical Co., both of Midland, Mich.

Manufacture cellulose xanthate suitable for production of viscose solutions. No. 2,122,519. Teunis Dokhum, Arnhem, Netherlands, to American Enka Corp., Enka, N. C.

Manufacture cellulose esters, using sulfuric acid. No. 2,122,572. John Edw. Jones and Arthur Chas. Cox, Spondon, near Derby, England, to Celanese Corp. of America.

Process for modifying properties of organic esters by cellulose; reducing acidyl content of ester by treatment with a hydrolyzable halide of titanium. No. 2,122,793. Henry Dreyfus, London, and Robt. Wighton Moncrieff, Spondon, England, to Celanese Corp. of America, corp. of Del.

Process of saccharification of cellulose. No. 2,123,211. Heinrich Scholler, Solln, near Munich, Germany.

Chemical Specialties

Colored roofing granules; rock granule having firmly affixed on its surface a heat-stable pigment attached thereto by a binder produced by interaction of boric acid and a sodium oxide compound. No. 2,120,773. Stephen G. Wright, Chicago, Ill.

Resistance element composed of conductive material and an alkyd resin modified with Chinawood oil. No. 2,120,930. Geo. M. Cooper to Chicago Telephone Supply Co., both of Elkhart, Ind.

Dispersing agent made by reacting a monomeric ester of an acid (*i.e.*, acrylic and methacrylic) with aqueous ammonia until a homogeneous solution is obtained, distilling ammonia and water from reaction product, then polymerizing an aqueous solution of the product. No. 2,120,933. Harry R. Dittmar to du Pont, both of Wilmington, Del.

Production indicium on a pellicle of a hydrophilic colloid; impregnating colloid with an organic water-miscible dyestuff solvent, then printing impregnated colloid in gel state with an ink containing a substantive dyestuff. No. 2,121,021. Ralph T. K. Cornwell to Sylvania Industrial Corp., both of Fredericksburg, Va.

Production an indicium on a pellicle of a hydrophilic colloid; treating pellicle with a dilute aqueous solution of an inorganic compound, treating colloid with a concentrated aqueous solution of another inorganic compound, then impregnating pellicle with an organic water-miscible swelling agent, and printing treated pellicle with an ink. No. 2,121,022. Ralph T. K. Cornwell to Sylvania Industrial Corp., both of Fredericksburg, Va.

Moistureproofing composition for wrapping materials; comprising a lacquer base, a wax, a wax-blending agent and a plasticizing resin. No. 2,121,023. Ralph T. K. Cornwell to Sylvania Industrial Corp., both of Fredericksburg, Va.

Detergent and wetting agents; compounds of the formula R(X)n. No. 2,121,032. Torsten Hasselstrom, New York City, to G. & A. Labs., Savannah, Ga.

Improved detergent and wetting agents. No. 2,121,033. Torsten Hasselstrom, New York City, to G. & A. Labs., Savannah, Ga.

Preparation insecticidal compositions. No. 2,121,038. Lindley E. Mills to Dow Chemical Co., both of Midland, Mich.

Aqueous insecticidal emulsion for living plants without causing injury thereto, made of petroleum distillate containing unsulfonatable residue, an emulsifying agent, and water. No. 2,121,039. Lindley E. Mills to Dow Chemical Co., both of Midland, Mich.

Print roll composition containing a binder, a softener, and water, softener comprising sorbitol and diethylene glycol. No. 2,121,126. Leander H. Harrison, New York City, to Atlas Powder Co., Wilmington, Del.

Print roll composition containing a binder, a softener and water, softener comprising sorbitol and glycerin. No. 2,121,131. Jas. T. Power to Atlas Powder Co., both of Wilmington, Del.

Treatment sized cloth to be sensitized; subjecting dry sized cloth to a solution of urea formaldehyde, polymerizing resin, and sensitizing treated cloth when dry. No. 2,121,205. Arnold Leroy Lippert and Wm. P. Hall to Jos. Bancroft & Sons Co., all of Wilmington, Del.

Aqueous emulsion comprising two emulsifiers in combination; one being a polyhydric alcohol, the other a fatty acid amino product. No. 2,121,305. Hans Schrader and Herbert Stahl to Th. Goldschmidt, all of Essen-on-Ruhr, Germany.

Preparation an oil varnish, comprising a castor oil phthalic glyceride resin blended with a drying oil. No. 2,121,334. Geo. Barsky, New York City.

Production oil varnish, composed of a varnish resin heated with a drying oil, then adding an unmodified phthalic glyceride type resin and heating. No. 2,121,335. Geo. Barsky, New York City, and Samuel S. Gutkin, Irvington, N. J., Gutkin assignor to Barsky.

Cleansing and wetting materials; aqueous solutions of water-soluble heavy metal salts of sulfonated aliphatic compounds. No. 2,121,485. Walter H. McAllister and Robt. A. Duncan, Wyoming, and Oscar T. Quimby, Cincinnati, O., to Procter & Gamble Co., Cincinnati, O.

Hypochlorite composition. No. 2,121,501. Paul R. Hershman, Chicago, Ill., to Oakite Products, Inc., New York City.

Manufacture cement; mixing Portland cement forming ingredients, and adding a barium compound to mix, then burning. No. 2,121,557. Malvin A. Baernstein to National Pigments & Chemical Co., both of St. Louis, Mo.

Footwear sole having a wearing surface simulating crepe rubber, using vulcanized dense rubber, sponge rubber, and a tack-reducing layer in formation. No. 2,121,678. Horace Francis Armor, Fairfield, Conn., to du Pont, Wilmington, Del.

Printed floor covering. No. 2,121,679. James Augustus Arvin and Geo. Lewis Schwartz to Krafelt Corp. of America, all of Wilmington, Del.

Artificial leather product; a flexible fabric sheet provided with a tough, pliable coating of cellulose nitrate composition containing a softener, coating having exudation temperature greater than 80°C. and high resistance to breaking upon rubbing coated faces of the artificial leather product together. No. 2,121,684. Merlin Martin Brubaker, Wilmington, Del., and Leo Phillip Hubbuch, Springfield, Pa., to du Pont, Wilmington, Del.

Production leather-like materials. No. 2,121,709. John J. Moriarty, Toronto, Ont., Canada, to du Pont, Wilmington, Del.

Stable lime soap grease made from a semi-solid emulsion of heavy mineral oil, fatty acid-lime soap, water, and phenyl-alpha-naphthylamine. No. 2,121,748. Geo. A. Suit, Ponca City, Okla., to Cities Service Oil Co., Bartlesville, Okla.

Welding flux containing chromium, and comprising columbium, silicon, and a slag-forming material composed of feldspar and calcium carbonate. No. 2,121,770. Cecil G. Chadwick, West New York, N. J., to Union Carbide & Carbon Corp., New York City.

Process of and apparatus for manufacturing saccharose from formaldehyde. No. 2,121,981. Eugene Albert Prudhomme, Kremlin-Bicetre, France to Carboxhyd, Ltd., Geneva, Switzerland.

Continuous process producing soap directly from a saponifiable material by reaction of a saponifying reagent, and recovering glycerin produced. No. 20,772. Reissue. Benj. Clayton, Houston, Tex., to Refining, Inc., Reno, Nevada.

Cork composition consisting of cork granules, a polyhydric alcohol plasticizer, and a mixture of adhesives. No. 2,121,791. Nelson S. Frink, Norwood, Mass., to Crown Cork & Seal Co., Balto., Md.

Manufacture high viscosity cellulose esters. No. 2,121,808. Carl J. Malm to Eastman Kodak Co., both of Rochester, N. Y.

Cork composition; comprising cork granules coated with a binder made from bodied tung oil and a glue. No. 2,121,809. Chas. E. MacManus, Spring Lake, N. J., to Crown Cork & Seal Co., Balto., Md.

Cork composition comprising cork granules, using bodied tung oil and a resin to constitute a binder. No. 2,121,810. Chas. E. MacManus, Spring Lake, N. J., to Crown Cork & Seal Co., Balto., Md.

Binder solution for application to surfaces of comminuted cork to form a body mass of loose, non-adherent, uncured, binder coated cork particles. No. 2,121,844. Andrew Weisenburg, Phila., Pa., to Crown Cork & Seal Co., Balto., Md.

Production clear, light-colored, water-soluble sulfonation products of mineral oils naturally containing more than 2% organically combined sulfur. No. 2,121,845. Erich Arnold Wernicke, Hamburg, Germany.

Bituminous paint consisting of pitch, a solvent, and aluminum stearate. No. 2,121,949. Edw. James Canavan, Teaneck, N. J., to Barrett Co., New York City.

Bleaching, washing and cleansing composition, comprising an aqueous alkaline solution containing an oxygen-liberating compound, a water-soluble salt of a phosphoric acid, and a difficultly soluble, colorless tin compound. No. 2,121,952. Herbert Colonius, Dusseldorf, and Friedrich Weldes, Dusseldorf-Benrath, Germany, to Henkel & Cie G. m. b. H., Dusseldorf-Holthauer, Germany.

Water softener; nitrogen-phosphorus complex obtained by reacting anhydrous ammonia with phosphorous pentoxide and heating in presence of excess anhydrous ammonia. No. 2,122,122. Willard H. Woodstock, Chicago Heights, Ill., to Victor Chemical Works, Chicago, Ill.

Water-soluble condensation products; treating in an alkaline medium lignin sulfonic acid and a hydroxy compound of the benzene series with an addition compound of a salt of sulfurous acid and a carbonyl compound. No. 2,122,124. Richard Alles, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Production water-soluble condensation products having good tanning action. No. 2,122,125. Richard Alles, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Expansion joint comprising envelope provided with cells and waterproofing material partly filling each cell. No. 2,122,167. Lester Wittenberg, New Rochelle, N. Y., to Barrett Co., New York City.

Production synthetic spinels according to known process of Verneuil, by fusing mixtures of zinc oxide and titanium dioxide. No. 2,122,180. Ekbert Lederle, Ludwigshafen-am-Rhine, Germany, and Rudolf Brill, Heidelberg, Germany, to I. G., Frankfort-am-Main, Germany.

Drilling fluid for oil and gas wells, characterized by air separating blast furnace flue dust resulting from reduction of iron ore and recovering only fine fraction, major portion being finer than 200 mesh, then mixing with beidellite and water to form suspension. No. 2,122,236. Arthur S. Nichols, Oak Park, and Jesse Lyle Essex, La Grange, Ill., to Illinois Clay Prods. Co., Joliet, Ill.

Liquid dielectric and insulating composition having essential chemical and physical properties of paraffin wax, which contains about 25 to 45% fluorine by weight. No. 2,122,278. Frank M. Clark, Pittsfield, Mass., to General Electric Co., corp. of N. Y.

Manufacture cellular firebrick of low heat conducting capacity; shredding old newspapers and blowing fragments through a fine screen to produce a fluffy mass of cellulose fibers, then mixing with fire clay. No. 2,122,288. John M. Knote to Quigley Co., both of So. River, N. J.

Resilient seal for refrigerating systems; substance comprising polymer of chloro-2-butadiene-1.3, magnesium oxide, zinc oxide, wood rosin and carbon. No. 2,122,378. Alex A. McCormack to General Motors Corp., both of Dayton, O.

Animal dip; an arsenic and sulfur containing mixture and the sodium salt of a sulfuric acid derivative of the reaction product of butyl alcohol and diphenyl. No. 2,122,389. Robt. L. Sibley, Nitro, W. Va., to Monsanto Chem. Co., St. Louis, Mo.

Manufacture electrolytic condensers; electrolytically forming an operating dielectric film on a filming electrode in an alkaline solution. No. 2,122,392. Preston Robinson, Williamstown, and Jos. L. Collins, So. Boston, Mass., to Sprague Specialties Co., No. Adams, Mass.

Production dark colored concrete without loss of strength; forming

U. S. Chemical Patents
Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 41

U. S. Chemical Patents

Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 42

paste of a colloidal suspension of impalpable carbon black in water by addition of a colloidal dispersing agent and mixing with concrete. No. 20,776. Reissue. Fred H. Amon, Weston, Mass., to Dewey & Almy Chemical Co., Cambridge, Mass.

Friction element having body of friction material including a fibrous material and a heat hardenable binder carrying inlays derived from powdered metals. No. 2,122,405. Chris. Bockius, Stamford, Conn., Clyde S. Batchelor, Hasbrouck Heights, and Judson A. Cook, Paterson, N. J., to Raybestos-Manhattan, Inc., Passaic, N. J.

Gasoline antioxidant; composition of a gum-forming gasoline and a lower dialkyl ester of p-hydroxyphenyliminodiacetic acid. No. 2,122,408. Hans T. Clarke, New York City, and Fred R. Bean, Rochester, N. Y., to Eastman Kodak Co., Jersey City, N. J.

Manufacture article having a water-sensitive base, a surface coating and an intermediate coating comprising an amino polymer which is insoluble in water and in 5% aqueous ammonia, but soluble in 2% aqueous acetic acid. No. 2,122,418. Ernest K. Gladding, Buffalo, N. Y., and Dorothy Bateman Maney, Old Hickory, Tenn., to du Pont, Wilmington, Del.

Manufacture article having a water-sensitive base, a surface coating and an intermediate coating comprising an aliphatic amine-phenol-aldehyde resin, insoluble in water and in 5% aqueous ammonia, but soluble in 2% aqueous acetic acid. No. 2,122,433. Fred. Madison Meigs to du Pont, both of Wilmington, Del.

Method inside frosting thin hollow glassware such as lamp bulbs; using solution of ammonium acid fluoride, 60% hydrofluoric acid, sodium acid sulfate, sodium fluoride, molasses and water. No. 2,122,512. Lyle E. Calkins and Ormonde S. Levi to Save Electric Corp., all of Toledo, O.

Liquid spraying agent for laying dust on open play grounds and like areas, being a colorless, odorless asphalt- and tar-free refined petroleum oil distillate, having dispersed therein hydrous degras. No. 2,122,524. Benj. F. Hunter, Pittsburgh, Pa., to Gulf Research & Development Co., corp. of Del.

Preparation phenolic condensation products; reacting on a halohydrin with a phenol free of active substituents, and having a reactive nuclear hydrogen atom, in presence of a metal halide. No. 2,122,581. Jos. B. Niederl, New York City.

Method obtaining permanent record of a latent finger print, using a finger print powder and a pliable transparent material. No. 2,122,589. Francis J. Sirchie, Conshohocken, Pa.

Solid, compressible abrasive article, whose abrasive particles are bonded with a co-polymer of chloroprene and a synthetic resin. No. 2,122,691. Jos. N. Kuznick, Passaic, and Lamar S. Hilton, Bloomfield, N. J., to Raybestos-Manhattan, Inc., Passaic, N. J.

Parasiticides; compounds of the formula R(CNX)y. No. 2,122,781. Paul L. Salzberg, Edge Moore, Del., to du Pont, Wilmington, Del.

Apparatus for testing hardness in water softeners. No. 2,122,824. Eric Pick to Permutit Co., both of New York City.

Fire-smothering, foam-producing liquid made from a normally stable aqueous solution of glycerine foots and sulfite cellulose liquor. No. 2,122,883. Orla E. Hood, Indianapolis, Ind., Elmer P. Warren, administrator of said Hood, deceased, assignor to Myrtle Hood.

Adherent, fluid, lubricant composed of a viscous mineral oil and a non-setting, gelling soap, including also an aliphatic oil-miscible grease-compatible organic solvent and a stabilizing organic ester. No. 2,122,940. Walter D. Hodson, Chicago, Ill.

Production aromatic sulfones and tanning agents. No. 2,122,958. Josef Schafer to J. R. Geigy, A. G., both of Basel, Switzerland.

Production colored asbestos-cement products. No. 2,123,028. Mikael Vogel-Jorgenson, Frederiksberg, near Copenhagen, Denmark, to F. L. Smidth & Co., New York City.

Flexible-backed abradant especially adapted for wet sanding operations, comprising a flexible base coated with particles of abrasive imbedded in a water-resisting resinous composition. No. 2,123,062. Fred G. Pellett, Schenectady, N. Y., to General Electric Co., corp. of N. Y.

Preparation alkaline earth filler for use in paper making. No. 2,123,173. Otto Kress and Chas. E. Johnson, to Institute of Paper Chemistry, all of Appleton, Wis.

Composite wrapping sheet material; using a rubber compound, a water-proofing resinous substance, and an adhesive gelatinous substance. No. 2,123,180. Elbert A. Corbin, Jr., Gradyville, and Ellwood E. Wolf, Phila., Pa., one-third to Wm. C. Biddle, Lansdowne, Pa.

Coal Tar Chemicals

Manufacturing biguanyl sulfonic acids; bringing about reaction between dicyandiamide and a hydroxyl free amino sulfonic acid of a cyclic radical of aromatic character, reaction taking place in acid aqueous medium. No. 2,120,808. Hans Z. Lecher, Plainfield, N. J., to Calco Chemical Co., Bound Brook, N. J.

Preparation compounds of the benzidine series. No. 2,120,811. Geo. H. Richards, Buffalo, N. Y., to National Aniline & Chemical Co., New York City.

Preparation benzene derivatives containing halogenated methyl groups. No. 2,121,330. Otto Scherer, Willy Schumacher, and Fritz Muller, Frankfort-am-Main, Germany, to General Aniline Works, New York City.

Production substitution products of diphenylene oxide. No. 2,121,331. Karl Zahn and Kurt Schimmelschmidt, Frankfort-am-Main-Hochst, Germany, to General Aniline Works, New York City.

Manufacture asphalt. No. 2,121,437. Elliott B. McConnell, Shaker Heights, O., to Standard Oil Co., Cleveland, O.

Production 2-amino-8-hydroxy-quinoline and its salts. No. 2,121,449. Herman J. Schneiderwirth, Laurelton, N. Y.

Removal asphalt from asphalt base oils. No. 2,121,517. David G. Brandt, Westfield, N. J., to Power Patents Co., Hillside, N. J.

Reacting a phenolic body, including a homologue of phenol, with an aldehyde in presence of a terpene material until a resin containing dipentene in chemical combination is obtained. No. 2,121,642. Israel Rosenblum, Jackson Heights, N. Y.

Production diazoamino compounds. No. 2,122,424. Jean G. Kern, Hamburg, N. Y., to National Aniline & Chemical Co., New York City.

Process oxidizing an asphalt component of a hydrocarbon fluid for production of blown asphalt. No. 2,122,764. John Samuel Wallis, New York City, and Harry B. Swanson, White Plains, N. Y., to Foster Wheeler Corp., New York City.

Preparation 2-amino-1, 4-bis-acylamino-anthraquinone. No. 2,122,882. Wilbert A. Herrett, Hamburg, N. Y., to National Aniline & Chemical Co., N. Y. City.

Preparation naphthene-hydrocarbon-amino-anthrapyrimidines. No. 2,123,245. Karl Koeberle and Otto Schlichting, Ludwigshafen-am-Rhine, Germany, to General Aniline Works, New York City.

Coatings

Manufactured article having rigid form whose exterior is covered with a sheet of an organic derivative of cellulose containing pleats. No. 2,121,013. Jos. H. Brown, Brooklyn, N. Y., to Celluloid Corp., corp. of N. J.

Sheet of cellulosic wrapping material coated with a moisture-resisting film comprising a cellulose ester and a resin. No. 2,121,028. Henry A. Gardner, Chevy Chase, Md., and Arnold Kirkpatrick, St. Louis, Mo., to Monsanto Chemical Co., St. Louis, Mo.

Temporary coating for rust protection of metallic bodies, consisting of a resin-like compound capable of forming a hard adherent film on metallic surfaces. No. 2,121,475. Frank W. Corkery, Clairton, Pa., to Penn Industrial Chemical Corp., corp. of Pa.

Solution for coating zinc or its alloys made from the anions of phosphoric and nitric acids and the cations of zinc and a metal from the group of nickel and cobalt. No. 2,121,574. Gerald C. Romig, Elkins Park, Pa., to American Chemical Paint Co., Ambler, Pa.

Coating for ferrous alloys comprising a colloidal aluminum silicate in a solution of water, boric acid, and magnesium oxide. No. 2,121,606. Leon McCulloch, Pittsburgh, Pa., to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Coating composition comprising a non-heat hardening resin consisting of ether linkages. No. 2,121,680. Jas. A. Arvin, Chicago, Ill., to du Pont, Wilmington, Del.

Article coated with a non-frosted and unwrinkled film of a baked resinous composition comprising urea-formaldehyde reaction product and polyhydric alcohol-polybasic acid resin modified with a drying oil. No. 2,121,690. Donald Edwards Edgar, Phila., Pa., to du Pont, Wilmington, Del.

Coating fabrics; using an aqueous latex colloid. No. 2,121,717. David J. Sullivan, Fairfield, Conn., to du Pont, Wilmington, Del.

A joint in the insulation of cables, which are insulated by a thermoplastic substance, consisting of mixture of albumin free rubber, deresinated balata and wax, jointing material for insulation consisting of mixture of gutta percha with polystyrol. No. 2,122,118. Ernst Studt to Norddeutsche Seekabelwerke Aktiengesellschaft, both of Nordenham, Oldenburg, Germany.

Production coated sheet metal articles, using coating of a soft thermoplastic enamel and another coating of hard thermoplastic enamel. No. 2,122,537. Edw. C. Pfeffer, Jr., Oak Park, Ill., to Continental Can Co., New York City.

Container coating made from ester gum, Japan wax, and petrolatum. No. 2,122,543. Wm. J. P. Tomsicek and Jose B. Calva, St. Paul, Minn., and Lloyd L. Dodge, Rhinelander, Wis., to Dodge Chem. & Mfg. Co., Chicago, Ill.

Stencil sheet having base of fibrous material coated with composition of an organic colloid, an oily softening agent, and an activated Japanese acid clay. No. 2,122,774. Shinjiro Horii, Kanda-ku, Tokyo, Japan.

Manufacture grease-proof container, applying to interior surface a continuous, non-porous, grease-proof film made from animal glue, glycerin, formaldehyde, and water. No. 2,122,907. Jose B. Calva, St. Paul, Minn., to General Products Corp., Minneapolis, Minn.

Dyes, Stains, etc.

Preparation metallized dyes, diazotizing an orthamino nitrophenol and coupling in weak acid solution with a phenyl methyl pyrazolone, then further treating azo dye with a compound. No. 2,120,799. Moses L. Crossley, Plainfield, and Lincoln M. Shafer, Highland Park, N. J., to Calco Chemical Co., Bound Brook, N. J.

Production coppered substantive azo dyes. No. 2,120,814. Francis Leslie Rose, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Production azo dyes derived from beta naphthol. No. 2,121,016. Troy Lee Cantrell, Lansdowne, Pa., and Jas. Otho Turner, Bartlesville, Okla., to Gulf Oil Corp., Pittsburgh, Pa.

Improved azo dye; the alkyl oxy-ethers of 4-nitro-phenyl-2-azo beta-naphthol. No. 2,121,017. Troy Lee Cantrell and Jas. Otho Turner, Lansdowne, Pa., to Gulf Oil Corp., Pittsburgh, Pa.

Process for dyeing mixed fabrics or other mixed fibrous materials consisting of regenerated cellulose and animal fibers. No. 2,121,337. Karl Brodersen and Alfred Peters, Dessau-in-Anhalt, Germany, to General Aniline Works, New York City.

Production azo compounds. No. 2,121,811. Jas. G. McNally and Jos. B. Dickey to Eastman Kodak Co., all of Rochester, N. Y.

Manufacture anthraquinone dyestuffs. No. 2,121,928. Albin Peter to Chemical Works, formerly Sandoz, both of Basel, Switzerland.

Production stable sulfuric acid ester salts of leuco-vat dyestuffs in dry state. No. 2,122,113. Roger Ratti to Durand & Huguenin S. A., both of Basel, Switzerland.

Production ortho-hydroxyazo dyes. No. 2,122,127. Walther Benade, Dessau in Anhalt, Germany, to General Aniline Works, New York City.

Manufacture lithographic reproductions; a light-sensitive element comprising gelatin-free egg-albumen, treated in presence of heat with a light desensitizing dye, and containing a chromatizing agent. No. 2,122,404. Fred Harvey Bloom, Fort Belvoir, Va.

Production vat dyestuffs of the anthraquinone series. No. 2,122,601. Fritz Baumann, Leverkusen I. G-Werk, Germany, to General Aniline Works, New York City.

Production acid dyestuffs of the anthraquinone series, capable of being chromed. No. 2,122,798. Georg Kranzlein, Ernst Diefenbach, Ernst Honold, Fritz Eggert and Helmut Krauss, all of Frankfort-am-Main, and Erich Fischer, Bad-Soden-on-Taunus, Germany, to General Aniline Works, New York City.

Color-coating roofing shingles and the like; spreading composition of intermingled alkali-metal silicate solution and a powder over surface of

U. S. Chemical Patents

Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 43

the shingles. No. 2,122,862. Carl E. Hillers to Blue Ridge Slate Corp., both of Charlottesville, Va.

Wood stain containing a water-soluble aniline dye in solution in methyl lactate. No. 2,122,895. Elwood J. Schuessele, Jenkintown, Pa., to Lawrence-McFadden Co., Phila., Pa.

Coloring textiles; first impregnating same with reagents capable of reacting to yield a nitrogenous resin, finally dyeing impregnated material. No. 2,123,152. Georges Rivat, Lyons, France, to Henry Dreyfus, London, England.

Production colored cire effects on textiles. No. 2,123,153. Georges Rivat, Lyons, France, to Celanese Corp. of America, corp. of Del.

Process for dyeing cellulosic fibers; first producing on fiber an insoluble salt of a substantive dyestuff and a substantive quaternary ammonium base. No. 2,123,154. Erik Schirm, Dessau, Germany, to General Aniline Works, New York City.

Explosives

Manufacture dense, colloided, smokeless powder, admixing fibrous nitrocellulose wet with water with nitroglycerine emulsified in water containing a water-soluble hydrophilic colloid in solution. No. 2,121,138. David R. Wiggam, West Chester, Pa., to Hercules Powder Co., Wilmington, Del.

Pyrotechnic composition containing a metallic fuel and an insoluble soap. No. 2,123,201. Chas. H. Pritham, Phila., Pa.

Fine Chemicals

Production new, basically substituted acridine compounds. No. 2,121,207. Fritz Mietzsch, Wuppertal-Elberfeld, and Hans Mauss, Wuppertal-Barman, Germany, to Winthrop Chemical Co., New York City.

Preparation lower dialkyl ester of p-hydroxy-phenyliminodiacetic acid. No. 2,122,409. Hans T. Clarke, New York City, and Fred. R. Bean, Rochester, N. Y., to Eastman Kodak Co., Rochester, N. Y.

Photographic developing bath for silver halide emulsions; being compound selected from group of benzoins, dioxindoles and 2,3 dihydroxythionaphthenes. No. 2,122,599. Gustav Wilmanns, Wolfen (Kreis Bitterfeld), and Wilhelm Schneider, Dessau (Anhalt), Germany, to Agfa Ansco Corp., Binghamton, N. Y.

Glass and Ceramics

Manufacture ceramic articles; mixing ceramic materials with latex as binder. No. 2,121,018. Mitchell Carter and Gustav Heinz, Trenton, N. J., Carter assignor to Edw. B. Carter, Morrisville, Pa.

Method cleaning sand for glass batches by oil flotation. No. 2,122,217. Orta D. Sisson, Oakland, Calif., to Hazel-Atlas Glass Co., Wheeling, W. Va.

Industrial Chemicals, etc.

Improved method manufacture hydrogen peroxide; oxidizing an amino substituted hydrazo compound in presence of an aqueous medium. No. 20,769. Reissue. Edw. C. Soule, Niagara Falls, N. Y., to Mathieson Alkali Works, New York City.

Process for obtaining zein in concentrated solution, having unaltered plasticity and reduced oil content. No. 2,120,946. Lloyd C. Swallen, Pekin, Ill., to Corn Prods. Refining Co., New York City.

Preparation reduced nickel hydrogenation catalyst; subjecting nickel carbonate catalyst body to action of a stream of di-atomic hydrogen. No. 2,120,958. Kenneth W. Coons, Tuscaloosa, Ala., to National Aniline & Chemical Co., New York City.

Production diaryl amines. Nos. 2,120-968-9. Marshall Francis Acken, Woodbury, N. J., to du Pont, Wilmington, Del.

Stabilizing vinylidine chloride. Nos. 2,121,009-10-11-12. Edgar C. Britton and Walter J. LeFevre to Dow Chemical Co., all of Midland, Mich.

Manufacture high grade sodium cyanide. No. 2,121,020. Ludwig J. Christmann, Jersey City, N. J., to American Cyanamid Co., New York City.

Production citric acid; mold fermenting a polysaccharide solution to citric acid, withdrawing citric acid from under the developed mycelium, introducing a monosaccharide solution under the mycelium and fermenting this solution to citric acid. No. 2,121,064. Justin Zender, Chauncey, N. Y., to Stauffer Chemical Co., New York City.

Manufacture beryllium; reducing beryllium oxide with aid of carbonaceous material in presence of a protective gas. No. 2,121,084. Osias Kruh, Vienna, Austria.

Process of contacting hydrocarbon vapors with ammonium pentachlorodizincate. No. 2,121,169. Franklin E. Kimball, Los Angeles, Calif.

Manufacture condensation products of dicarboxylic acid anhydrides. No. 2,121.183. Joseph Binapfl, Krefeld-Uerdingen, Germany, to I. G., Frankfort-am-Main, Germany.

Preparation hydrous titanium oxides by thermal hydrolysis from a titanium sulfate solution. No. 2,121,215. Paul Weise and Friedrich Raspe to Titangesellschaft M. B. H., all of Leverkusen-I. G. Werk, Germany.

Preparation ethylene glycol di-(halo-aryloxy-acetates). No. 2,121,226. Ernest F. Grether, Wm. R. Shawver, and Russell B. Du Vall to Dow Chemical Co., all of Midland, Mich.

Preparation quinophthalonemonosulfonic acids; compound obtained by heating at temperature of about 170°C. for about 13 hrs. the SO_3 addition product of 3-hydroxyquinophthalone and removing reaction water. No. 2,121,320. Georg Kranzlein and Ludwig Schornig, both of Ludwigshafen-am-Rhine, and Hans Schlichenmaier, Kelkheim-in-Taunus, Germany, to General Aniline Works, New York City.

Manufacture an alkylidene diester; subjecting an aliphatic acid to reaction in the vapor phase with an unsaturated hydrocarbon of the acetylene series. No. 2,121,342. Henry Dreyfus, London, England.

Catalytic hydrogenation of high molecular non-aromatic carboxylic acids. No. 2,121,367. Georg Schiller, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Catalytic hydrogenation of metal salts of high molecular non-aromatic carboxylic acids. No. 2,121,368. Georg Schiller, Mannheim, Germany, to I. G., Frankfort-am-Main, Germany.

Stable, free-flowing composition comprising a salt of hydrosulfurous acid which is normally unstable in presence of air; said salt having superposed thin coating of a natural resin. No. 2,121,397. Fred. B. Downing, Carneys Point, and Chas. J. Pedersen, Penns Grove, N. J., to du Pont, Wilmington, Del.

Production zinc sulfate monohydrate. No. 2,121,399. Ivan L. Haag, Cleveland, O., to du Pont, Wilmington, Del.

Manufacture carbon black by cracking dissociable hydrocarbon gas. No. 2,121,463. Stuart A. Wisdom, Shawinigan Falls, Que., Canada, to Canadian Electro Products Co., Montreal, Canada.

Preparation oxidation products of octyl cyclohexanol. No. 2,121,472. Jos. B. Niederl and Richard A. Smith, New York City, to Rohm & Haas Co., Phila., Pa.

Maintenance and operation phosphating baths for providing ferrous metals with a protective coating. No. 2,121,520. Leo P. Curtin, Cranbury, N. J., to Curtin-Howe Corp., New York City.

Recovery sulfur from sulfur ores. No. 2,121,544. Ernest Klepetko, Pacific Palisades, and Leo G. Wright, Los Angeles, Calif.

Art refining edible oils, fats and analogous products, using organic peroxide and a precipitant in process. No. 2,121,545. Vaman R. Kokatnur and Oliver S. Plantinga to Autoxygen, Inc., all of New York City.

Production aliphatic dinitriles containing at least 3 carbon atoms. No. 2,121,551. Geo. Wayne Rigby to du Pont, both of Wilmington, Del.

Hydrogenation of oiticica oil and production 1,4-octadecanediol and stearyl alcohol formed therewith. No. 2,121,580. Julius F. T. Berliner and Caryl Sly to du Pont, all of Wilmington, Del.

Method reducing value of the back current in a selenium rectifier by treatment with a reducing agent. No. 2,121,603. Albert Lotz, Berlin-Siemensstadt, Germany, to Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Production naphthenyl esters of phosphorous acids. No. 2,121,611. Paul Lawrence Salzberg, Carrcroft, Del., to du Pont, Wilmington, Del.

Production sulfates of polybasic acid esters. No. 2,121,616. James Herbert Werntz to du Pont, both of Wilmington, Del.

Preparation a secondary straight chain neutral alkyl ester of a monosulfato-polycarboxylic acid, wherein alkyl group contains at least 6 carbon atoms, and the sulfato-polycarboxylic acid contains less than 15 carbon atoms and has no hydroxyl substitutes. No. 2,121,617. Jas. Herbert Werntz to du Pont, both of Wilmington, Del.

Method densifying carbon black that contains entrained air. No. 2,121,633. Jos. Hartman, Pittsburgh, Pa., and Wm. A. Knapp, Monroe, La., to Imperial Oil & Gas Products Co., Pittsburgh, Pa.

Method of and apparatus for forming condensed carbon black. No. 2,121,635. Wm. A. Knapp and Warren W. Gregory, Monroe, La., to Imperial Oil & Gas Products Co., Pittsburgh, Pa.

Process for causing uniform distribution of comminuted cork into paper pulp; forming dispersion of cork in water containing a wetting and a dispersing agent, and intimately mixing with paper pulp. No. 2,121,703. Louis Leonard Larson to Krafelt Corp. of America, both of Wilmington, Del.

Preparation aralkyl ethers. No. 2,121,723. Shailer L. Bass, Midland, and Edw. M. Van Duzee, deceased, late of Midland, by Clarence H. Macomber, administrator, Midland, to Dow Chemical Co., Midland, Mich.

Preparation aralkyl ethers of ethyl-phenol compounds. No. 2,121,724. Shailer L. Bass, Midland, and Edw. M. Van Duzee, deceased, late of Midland, by Clarence H. Macomber, administrator, Midland, to Dow Chemical Co., Midland, Mich.

Method calcining phosphate-bearing material to eliminate fluorine without liberating phosphorus. No. 2,121,776. Thaddeus F. Baily, Canton, O.

Complete purification of air mixed with hydrogen sulfide; contacting air with activated charcoal impregnated with an inorganic compound of iodine. No. 2,121,793. John C. Goshorn and Paul O. Rockwell, Balto., Md.

Manufacture sulfonium compounds. No. 2,121,823. Henry Alfred Piggott, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Carbon electrode having core made of magnesium, vanadium, and chromium. No. 2,121,882. Brian O'Brien, Rochester, N. Y.

Method converting acetone-insoluble cellulose triacetate into acetone-soluble form; heating triacetate with isobutyl alcohol in presence of an esterifying catalyst and in absence of acetic anhydride and glacial acetic acid. No. 2,121,899. Harold Allden Auden, Banstead, Hanns Peter Staudinger, Epsom, and Philip Eaglesfield, Carshalton, England, to Ernest Berl, Pittsburgh, Pa.

Method purification and separation starch, using nitric acid in process. No. 2,121,919. Karl Paul Link, Carl G. Niemann and Ray H. Roberts, to Wisconsin Alumni Research Foundation, all of Madison, Wis.

Method dehydrating aqueous alcohols. No. 2,121,954. Geo. Lewis Cunningham, Niagara Falls, N. Y., to Mathieson Alkali Works, Inc., New York City.

Purification titanium fluoride solutions. No. 2,121,992. Melvin J. Sertba, Riverside, Ill., to Sherwin-Williams Co., Cleveland, O.

Halogenation of aliphatic alcohols. No. 2,122,110. John F. Olin and Geo. E. Hinds, Grosse Ile, Mich., to Sharples Solvents Corp., Phila., Pa.

Production diethyl ether of triethylene glycol. No. 2,122,129. Henry L. Cox, So. Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York City.

Preparation phthalocyanine of the benzene series, being substituted in the benzene nuclei by substituents selected from the group of alkyloxy and aryloxy groups. No. 2,122,137. Sebastian Gassner and Berthold Bienert, Leverkusen-I. G. Werk, Rhine, Germany, to General Aniline Works, New York City.

Apparatus for mixing and reacting purposes. Nos. 2,122,173-4. Orton B. Brown to Brown Co., both of Berlin, N. H.

Apparatus for mixing and dissolving material. No. 2,122,187. Harold B. Vollrath, Bronxville, N. Y.

Manufacture viscose. No. 2,122,188. Harold B. Vollrath, Bronxville, N. Y.

Process and apparatus for separation of gas mixtures. No. 2,122,238. Franz Pollitzer, Grosshesselohe, near Munich, Germany, to Union Carbide & Carbon Corp., New York City.

U. S. Chemical Patents
Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 43

U. S. Chemical Patents

Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 44

Deodorizing and bleaching oils. No. 2,122,260. Landon C. Moore, Dallas, and Arthur C. Norman, deceased, late of New Boston, by Smithia S. Norman, executrix, New Boston, Tex.

Treatment tobacco, using bath containing hydrogen peroxide. No. 2,122,421. Alfred T. Hawkinson, Palmyra, N. J., to du Pont, Wilmington, Del.

Gas filtering material having a porous base, and thereon coating of tricresyl phosphate. No. 2,122,514. Ernest C. Crocker, Belmont, and Howard J. Billings, Acton, Mass., to Arthur D. Little, Inc., corp. of Mass.

Method activating carbon whereby its activity as a precious metal precipitant is increased. No. 2,122,527. Otto Lebrecht Krohl, St. Albans, District Port Elizabeth, Cape Province, So. Africa, to Tube Gold Extractors Pty., Ltd., Johannesburg, So. Africa.

Production concentrated sulfur dioxide. No. 2,122,544. Conway Baron von Girsewald, Hans Weidmann, and Gerhard Roesner, Frankfort-am-Main, Germany, to American Lurgi Corp., New York City.

Apparatus for mixing volatile liquids with solid materials. No. 2,122,551. Ralph R. Allingham, White Plains, N. Y., to Barrett Co., New York City.

Separation gypsum from mineral composed of interlocked grains of gypsum and limestone and/or dolomite, using fatty acid salt in process. No. 2,122,569. Donald N. Griffin to Deister Concentrator Co., both of Ft. Wayne, Ind.

Purification CO_2, using sulfuric acid in process. No. 2,122,586. Gustave T. Reich, Phila., Pa.

Method dehydrating hydrated sodium tetraborate. No. 2,122,634. Leroy G. Black to American Potash & Chem. Corp., both of Trona, Calif.

Reduction aliphatic nitriles having at least 8 carbon atoms with sodium and an alcohol. No. 2,122,644. Jas. Harwood to Armour & Co., both of Chicago, Ill.

Starch tabling process; manufacture starch from corn. No. 2,122,647. Fred. L. Jefferies, La Grange, Ill., to International Patents Co., Wilmington, Del.

Preparation hydroxy carboxylic acid esters of long chain alcohols. No. 2,122,716. Geo. D. Graves to du Pont, both of Wilmington, Del.

Preparation an aliphatic gamma-alkynyl-gamma lactone. No. 2,122,719. Oscar Robt. Kreimeier, Woodstown, N. J., to du Pont, Wilmington, Del.

Preparation artificial oxide of manganese containing manganese dioxide, oxidizing manganous hydroxide in an aqueous ammoniacal solution. No. 2,122,735. Alfred Felix Sebastien Bellone, Lyon, France, to Societe des Usines Chimiques Rhone-Poulenc, Paris, France.

Hydrogenation unsaturated ethers and esters. No. 2,122,812. Herbert P. A. Groll, Berkeley, and James Burgin, Oakland, Calif., to Shell Development Co., San Francisco, Calif.

Production polyhydric alcohol containing at least one tertiary carbinol group. No. 2,122,813. Herbert P. A. Groll and Geo. Hearne, Berkeley, Calif., to Shell Development Co., San Francisco, Calif.

Production valuable products from unsaturated organic compounds. No. 2,122,826. Adrianus Johannes van Peski, Amsterdam, Netherlands, to Shell Development Co., San Francisco, Calif.

Light filter having as active ingredient a practically colorless pyrene compound. No. 2,122,828. Christian Wiegand and Erich Merkel, Wuppertal-Elberfeld, and Ernst Tietze, Cologne, Germany, to Winthrop Chemical Co., New York City.

Photoelectric cathode comprising a bismuth layer and a caesium layer alloyed together. No. 2,122,860. Paul Gorlich to Zeiss Ikon Aktiengesellschaft, both of Dresden, Germany.

Polymerization of gases. No. 2,122,878. Morris T. Carpenter, Chicago, Robt. F. Ruthruff, Hammond, Ind., and Jos. K. Roberts, Flossmoor, Ill., to Standard Oil Co., Chicago, Ill.

Butyl alcohol fermentation process. No. 2,122,884. David A. Legg and Hugh R. Stiles to Commercial Solvents Corp., all of Terre Haute, Ind.

Batch process of polymerizing an ester from the group of acrylic, methacrylic, and homologous acids, to obtain a granular polymer. No. 2,122,886. Barnard M. Marks, Arlington, N. J., to du Pont, Wilmington, Del.

Production acetylene from calcium carbide. No. 2,122,889. Otto Mues, Frankfort-am-Main-Schwanheim, Germany, to I. G., Frankfort-am-Main, Germany.

Composition suitable for improving organic fibrous materials: an aqueous solution containing a dyestuff and a salt of an organic ammonia base. No. 2,122,981. Winfrid Hentrich, Erlangen, Helmut Keppler, Leverkusen, and Hermann Holsten, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Method recovering zinc sulfate dihydrate from a neutral zinc sulfate solution. No. 2,122,997. Fred. C. Abbott, and Henry W. W. Doennecke to Ozark Chemical Co., all of Tulsa, Okla.

Production hydrogen sulfide. No. 2,123,000. Bernard M. Carter, Montclair, N. J., to General Chemical Co., New York City.

Preparation aminoguanidine by reduction of nitroguanidine with zinc dust in presence of water. No. 2,123,032. Jos. A. Wyler, Allentown, Pa., to Trojan Powder Co., both of Allentown, Pa.

Separation nitrosyl chloride from a gas containing the same. No. 2,123,072. Herman A. Beekhuis, Jr., Petersburg, Va., to Solvay Process Co., New York City.

Manufacture alkyl sulfur halides; of the formula R-S-X, wherein R is an unsubstituted alkyl group and X is a halogen. No. 2,123,082. Walter A. Schulze, Bartlesville, Okla., to Phillips Petroleum Corp., corp. of Del.

Method sterilizing a filter bed containing activated carbon; incorporating iodine in an aqueous solution, and passing solution through filter bed in contact with the carbon. No. 2,123,092. Abraham Sidney Behrman, Chicago, Ill., to Infilco, Inc., corp. of Del.

Production magnetizable materials consisting of nickel and iron. No. 2,123,138. Hans Hiemenz, Hanau-am-Main, Germany.

Tube or container for use at temperatures of the order of 1000°F. in heating fluids under high pressure, composed of alloy made from chromium, molybdenum, carbon, and iron. No. 2,123,144. Harold D. Newell, Beaver Falls, Pa., to Babcock & Wilcox Tube Co., West Mayfield, Pa.

Preparation thiocyano-fatty acid esters. No. 2,123,186. Albert K. Epstein and Benj. R. Harris, Chicago, Ill.

Production sulfur. No. 2,123,224. Hans Baehr and Walter Gross, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Leather

Preparation iron-tanned leathers; treating unhaired hides with solution of a complex iron compound which contains an organic substitution product of ammonia in the complex. No. 2,122,133. Hans Dohse, Heidelberg, and Werner Huehn, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Metals, Alloys, Ores

Cyclic treatment alunite ores to derive therefrom aluminum oxide. No. 2,120,840. Wm. E. McCullough to Bohn Aluminum & Brass Corp., both of Detroit, Mich.

Production free-cutting steel containing sulfur and alloy metal. No. 2,120,894. Johannes Haag, Neunkirchen, Germany.

Corrosion-resistant alloy iron of good ductility and weldability, which is unsubstantially hardenable by heat-treatment, made from chromium, nitrogen, carbon, and iron. No. 2,121,001. Wm. Bell Arness to Rustless Iron & Steel Corp., both of Balto., Md.

Corrosion resisting iron containing carbon, nitrogen, phosphorus, copper, molybdenum, and iron. No. 2,121,055. Earle C. Smith, Cleveland Heights, and Geo. T. Motok, Canton, O., to Republic Steel Corp., Cleveland, O.

Production titanium iron alloy. No. 2,121,056. Earle C. Smith, Cleveland Heights, and Geo. T. Motok, Massillon, O., to Republic Steel Corp., Cleveland, O.

Production arsenic iron alloy. No. 2,121,057. Earle C. Smith, Cleveland Heights, and Geo. T. Motok, Massillon, O., to Republic Steel Corp., Cleveland, O.

Non-ferrous welding rod consisting of a coherent aggregate containing dendritic comminuted copper. No. 2,121,194. Chas. Hardy, Pelham, N. Y., to Linde Air Products Co., corp. of Ohio.

Alloy for providing a bearing which is capable of preventing excessive wearing or scoring of the shaft or other associated parts in absence of a lubricating medium containing copper, lead, and nickel. No. 2,121,204. Edw. P. Langworthy to Bearium Metals Corp., both of Rochester, N. Y.

Magnesium rich alloys containing cerium, manganese, calcium, magnesium, and another element. No. 2,121,292. John Leslie Haughton and Wm. Eliezer Prytherch, Teddington, England.

Deoxidation of technically pure zinc. No 2,121,306. Franz Schreiber, Cologne-Klettenberg, Germany.

Non-corrodible alloy articles comprising chromium, nickel, nitrogen, and iron, said articles being hardened by cold reduction, giving desired strength in combination with retained ductility. No. 2,121,391. Wm. B. Arness, to Rustless Iron and Steel Corp., both of Balto., Md.

Treatment zinc; heating same in an atmosphere comprising ammonium fluoride vapors and an oxygen-supplying reagent. No. 2,121,412. Walter B. Schulte, Madison, Wis., to C. F. Burgess Labs., Chicago, Ill.

Hard metal composition for tools, dies, hard machine parts, etc., made from tungsten carbide, cobalt, tungsten, chromium, and carbon. No. 2,121,448. Gunther Ritzau, Berlin-Siemensstadt, Germany, to Siemens and Halske, Aktiengesellschaft, Siemensstadt, near Berlin, Germany.

Oxidizing metallic copper to copper oxide by action of air. No. 2,121,602. Richard L. Lloyd, Great Neck, N. Y., and Reed W. Hyde, Summit, N. J., Stella Warde Lloyd, executrix of said Richard L. Lloyd, deceased, to Dwight & Lloyd Sintering Co., New York City.

Production cobalt-nickel base alloy. No. 2,121,759. Erwin F. Lowry, Forest Hills, Pa., to Westinghouse Electric & Mfg. Co., corp. of Pa.

Production cast permanent magnets; alloy consisting of iron oxide, aluminum, and nickel. No. 2,121,799. Hugh A. Howell, Berwyn, Ill., to Frank Raffles, Chicago, Ill.

Method sulfating an ore material, using anhydrous sulfuric acid in process. No. 2,121,887. Royal L. Sessions, Inglewood, and Donald C. Mitchell, Los Angeles, Calif., to Hughes-Mitchell Processes, Inc., Denver, Colo.

Mixture for casting molds suitable for high temperature metals, consisting of fused magnesium oxide and hydrated calcium oxide. No. 2,121,969. Alfred W. Laird, Chicago, Ill., to Western Electric Co., New York City.

Manufacture porous metallic bodies, mixing a powdered metal compound with another substance and a metal hydroxide. No. 2,122,053. Hans Burkhardt, Berlin-Lankwitz, Germany, to Accumulatoren-Fabrik Aktiengesellschaft, Berlin, Germany.

Method recovering compact metallic magnesium from powdered magnesium. No. 2,122,139. Fritz Hansgirg, Konan, Korea, to American Magnesium Metals Corp., Pittsburgh, Pa.

Hard metal alloy for tools and other working appliances. No. 2,122,157. Paul Schwarzkopf, Reutte, Austria, to American Cutting Alloys, Inc., New York City.

Process for uniting lead or lead alloy surfaces; welding same in presence of a sodium acetate flux. No. 2,122,185. Albert A. Smith, Jr., Metuchen, N. J., to American Smelting & Refining Co., New York City.

Production iron from iron ore. No. 2,122,197. Fred. Lindley Duffield, London, England.

Hard alloy comprising a metal of the iron group, chromium, a metal from the group of tungsten and molybdenum, and a refractory metal. No. 2,122,403. Clarence W. Balke, Highland Park, Fred. L. Hunter, Lake Bluff, and Roy A. Haskell, Waukegan, Ill., to Fansteel Metallurgical Corp., No. Chicago, Ill.

Production calcium metal; heating mixture of calcium carbide and metallic material containing silicon to temperature capable of liberating calcium. No. 2,122,419. Jos. D. Hanawalt to Dow Chemical Co., both of Midland, Mich.

Manufacture metallic calcium; heating calcium silicide in presence of iron to temperature capable of liberating calcium. No. 2,122,420. Jos. D. Hanawalt and Chas. E. Nelson to Dow Chemical Co., all of Midland, Mich.

Production metallic magnesium; heating together silicon carbide and a magnesium oxide-containing material to temperature capable of liberating magnesium. No. 2,122,435. Chas. E. Nelson and John S. Peake, to Dow Chemical Co., all of Midland, Mich.

Manufacture metallic calcium; heating mixture of calcium carbide and calcium silicide to temperature capable of liberating calcium. No. 2,122,446. Louis E. Ward to Dow Chemical Co., both of Midland, Mich.

Duplex metal article having aluminum base alloy core covered with

an aluminum base alloy coating. No. 2,122,535. Jos. A. Nock, Jr., Tarentum, Pa., to Aluminum Co. of America, Pittsburgh, Pa.

Method froth concentrating ores. No. 2,122,659. Anderson W. Ralston and Wm. O. Pool to Armour & Co., all of Chicago, Ill.

Sintered hard metal alloys containing one or more vanadium compounds. No. 2,123,046. Joseph Hinnuber, Essen-Ruttenscheid, Germany, to General Electric Co., Schenectady, N. Y.

Method plating steel. No. 20,788. Reissue. John S. Nachtman, Beaver, Pa., to Blaw-Knox Co., Pittsburgh, Pa.

Method bonding ferrous and non-ferrous metals. No. 2,123,181. Horace E. Deputy, Rochester, Minn.

Method treating complex ores to recover valuable metals or metal compounds. No. 2,123,240. Axel Hammarberg, Lidingo, Sweden.

Paper and Pulp

Apparatus and process for making thin paper stock. No. 2,122,394. Carlton H. Allen, Glens Falls, N. Y.

Petroleum Chemicals

Solvent fractionation of hydrocarbon mixtures. No. 2,120,810. Geo. L. Parkhurst to Standard Oil Co., both of Chicago, Ill.

Process refining and converting oil. No. 2,121,026. Chauncey B. Forward, Urbana, O., to Forward-Process Co., Dover, Del.

Manufacture high anti-knock motor fuel product containing in excess of 50% aromatic hydrocarbons boiling within the gasoline range. No. 2,121,027. Chauncey B. Forward, Urbana, O., to Forward Process Co., Dover, Del.

Conversion and treatment mineral oils. No. 2,121,046. Arthur E. Pew, Jr., Bryn Mawr, Pa., to Houdry Process Corp., Wilmington, Del.

Lubricating oil for withstanding high bearing pressures; subjecting a lubricating oil base to mild oxidation to increase solvency for lead soaps, adding a lead soap, then a sulfurizing agent uncombined with the lead of the lead soap. No. 2,121,151. Chas. B. Karns, Pittsburgh, Pa., to Standard Oil Development Co., corp. of Del.

Acid treatment of petroleum oils. No. 2,121,167. Leslie U. Franklin, Sweetwater, Tex., to Gulf Oil Corp., corp. of Pa.

Treatment hydrocarbon oil. No. 2,121,209. Wm. F. Moore, Bayside, N. Y., to Gasoline Products Co., Newark, N. J.

Method recovering a hydrocarbon oil from mixture of oil, vapor and steam. No. 2,121,218. John H. Erter, White Plains, N. Y., to Alco Products, Inc., New York City.

Polymerization olefin-containing hydrocarbon gases. No. 2,121,258. Rudolph C. Osterstrom and Cary R. Wagner to Pure Oil Co., all of Chicago, Ill.

Solvent refining process. No. 2,121,323. Robt. E. Manley, Bernard Y. McCarty, and Howard H. Gross, Beacon, N. Y., to Texas Co., New York City.

Solvent extraction of oil. No. 2,121,325. David R. Merrill, Long Beach, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Purification petrolatum; filtering same through activated bauxite under pressure of at least 30 lbs. per sq. in. in excess of atmospheric. No. 2,121,518. Ferdinand W. Breth, New York City, and Anthony Kinsel, Petrolia, Pa., to L. Sonneborn Sons, corp. of Del.

Lubricant containing a mineral lubricating oil and a halogenated alkylated aromatic compound. No. 2,121,824. Carl F. Prutton, Cleveland Heights, O., to Lubri-Zol Development Corp., Cleveland, O.

Lubricant containing a mineral lubricating oil and a halogenated alkylated toluene compound. No. 2,121,825. Carl F. Prutton, to Lubri-Zol Development Corp., both of Cleveland, O.

Method increasing oiliness value of lubricating oils and lubricating oils prepared by such method. No. 2,121,976. Louis A. Mikeska and Chas. A. Cohen, Elizabeth, N. J., to Standard Oil Development Co., corp. of Del.

Cracking process. No. 2,121,978. Albert C. Patterson, Roselle, N. J., to Standard Oil Development Co., corp. of Del.

Manufacture a kerosene containing 5 to 50% of a hydrogenated polymerized olefine having a molecular weight of 125 to 225. No. 2,121,998. Joshua A. Tilton, Baton Rouge, La., to Standard-I. G. Co.

Propane dewaxing system. No. 2,122,019. Chester E. Adams, Hammond, Ind., and Fred W. Scheineman, Chicago, to Standard Oil Co., Chicago, Ill.

Method refining petroleum oil fractions of the lubricating oil type previously treated with sulfuric acid. No. 2,122,059. Donald K. Harger, Hermosa Beach, and Harold L. Wolff, Albany, Calif., to Standard Oil Co. of Calif., San Francisco, Calif.

Process of inhibiting degradation of mineral lubricating oils in exposure to heat; incorporating with oil tetramethyldiaminodiphenylmethane. No. 20,784. Reissue. John M. Musselman and Herman P. Lankelma to Standard Oil of Ohio, all of Cleveland, O.

Acid treatment of wells. No. 2,122,452. Chas. E. Clason, Wichita, Kans., to Halliburton Oil Well Cementing Co., Duncan, Okla.

Separation constituents of mineral oils. No. 2,122,457. Eddie M. Dons, Oswald G. Mauro, and Dwight B. Mapes to Mid-Continent Petroleum Corp., all of Tulsa, Okla.

Method and means for acidizing wells; using a highly viscous blanketing solution made by mixing a non-jellifying water soluble gum in an aqueous salt solution. No. 2,122,483. Paul L. Menaul to Halliburton Oil Well Cementing Co., both of Duncan, Okla.

Apparatus for testing lubricants. No. 2,122,578. Archie J. McMaster, Highland Park, and Andrew Christy, Chicago, Ill., to G-M Labs., Chicago, Ill.

Method vaporizing liquid hydrocarbon fuels heavier than kerosene. No. 2,122,684. Chas. A. French, Riverside, Ill., to Mark C. Bates, Chicago, Ill.

Method vaporizing a heavy fuel oil. No. 2,122,705. Edgar C. Welborn and Henry J. Smith to Mark C. Bates, all of Chicago, Ill.

Hydrocarbon oil conversion. No. 2,122,777. Jacque C. Morell to Universal Oil Prods. Co., both of Chicago, Ill.

Conversion hydrocarbon oils. No. 2,122,784. Kenneth Swartwood to Universal Oil Prods. Co., both of Chicago, Ill.

Dehydrogenation of gaseous paraffin hydrocarbons, to produce olefin hydrocarbons, subjecting same to elevated temperature in presence of magnesium oxide, chromium trioxide, and zinc oxide. No. 2,122,786. Hans Tropsch to Universal Oil Prods. Co., both of Chicago, Ill.

Dehydrogenating hydrocarbons in presence of a magnesium oxide catalyst containing a chromate. No. 2,122,787. Hans Tropsch to Universal Oil Prods. Co., both of Chicago, Ill.

Dehydrogenation of gaseous paraffin hydrocarbons to produce olefin hydrocarbons, subjecting same to action of a catalyst comprising mixture of aluminum oxide and a chromate and a salt of an acid. No. 2,122,788. Hans Tropsch to Universal Oil Prods. Co., both of Chicago, Ill.

Catalyst suitable for converting paraffins into olefins, being mixture of aluminum oxide and lead chromate. No. 2,122,789. Hans Tropsch to Universal Oil Prods. Co., both of Chicago, Ill.

Conversion gaseous paraffin hydrocarbons into their corresponding olefins in presence of magnesium oxide. No. 2,122,790. Hans Tropsch to Universal Oil Prods. Co., both of Chicago, Ill.

Stabilization sulfur-containing petroleum oils against color deterioration or gum formation, using an aqueous solution of an alkali metal carbonate. No. 2,122,795. Basil Hopper, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Method for vapor phase cracking of oil. No. 2,122,881. Earle W. Gard, Palos Verdes Estates, Calif., to Union Oil Co. of Calif., Los Angeles, Calif.

Treatment liquid hydrocarbon mixtures to produce a splitting of the hydrocarbons of said mixtures into lower boiling hydrocarbons. No. 2,122,903. Karl Winkler, Leuna, Germany, to I. G., Frankfort-am-Main, Germany.

Separating petroleum emulsions. No. 2,122,976. Ivor M. Colbeth, East Orange, N. J., to Baker Castor Oil Co., New York City.

Motor fuel comprising cracked gasoline, tending to deteriorate on storage, containing an alphanaphthylamine and a polyhydric phenol to retard deterioration. No. 2,123,083. LeRoy G. Story, Mt. Vernon, N. Y., to Texas Co., New York City.

Treatment hydrocarbon oil. No. 2,123,194. Malvin R. Mandelbaum, New York City, to Gray Processes Corp., Newark, N. J.

Hydrocarbon oil treatment. No. 2,123,205. Oscar L. Roberts, Drexel Hill, Pa., to Atlantic Refining Co., Phila., Pa.

Pigments, Dry Colors and Fillers

Weather resistant pigment; adding natural calcium sulfate to an aqueous solution of zinc sulfate, and precipitating by addition of a soluble sulfide. No. 2,122,297. Harold F. Saunders, Chicago, Ill., to Sherwin-Williams Co., Cleveland, O.

Resins, Plastics, etc.

Plastic composition having great strength and toughness composed of a water-insoluble partial polyvinyl acetal resin combined with a polyethylene glycol hexoate. No. 2,120,927. Chas. M. Blair, Charleston, and Thos. F. Carruthers, So. Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York City.

Process for intimately mixing a partial polyvinyl acetal resin with a compatible ester plasticizer to form a clear and homogeneous plastic composition. No. 2,120,931. Henry L. Cox, So. Charleston, and Jacob D. Matlack, Charleston, W. Va., to Carbide & Carbon Chemicals Corp., New York City.

Manufacture clear and homogeneous plastic compositions free of uncolloided particles; first intimately mixing a water-insoluble partial polyvinyl acetal resin with a compatible ester plasticizer. No. 2,120,934. Frazier Groff, Lakewood, O., to Carbide & Carbon Chemicals Corp., New York City.

Process shaping a plasticized partial polyvinyl acetal resin composition. No. 2,120,935. Frazier Groff, Lakewood, O., to Carbide & Carbon Chemicals Corp., New York City.

Production textiles with calendar finish permanent to washing; impregnating same with an aqueous carbamide resin-forming solution. No. 2,121,005. Christian Bener, Chur, Switzerland, to Raduner & Co., A.-G., Horn, Switzerland.

Method for rendering textiles resistive against shrinking; impregnating same with an aqueous solution containing the components of a resin capable of being hardened by heat. No. 2,121,006. Christian Bener, Chur, Switzerland, to Raduner & Co., A.-G., Horn, Switzerland.

Molding composition in dry comminuted form, comprising a carbohydrate-modified urea-aldehyde resin. No. 2,121,076. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Production glass-clear synthetic resin. No. 2,121,077. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Ship deck mortar-like adhesive plastic. No. 2,121,087. Jos. Labra, Long Island City, N. Y.

Venetian blind slat made from plastic material comprising resin of the thermosetting type incorporated with a filler. No. 2,121,217. Carleton Ellis to Ellis-Foster Co., both of Montclair, N. J.

Synthetic resinous material; reaction product of maleic anhydride with a reactive rosin compound. No. 2,121,294. Irvin W. Humphrey to Hercules Powder Co., both of Wilmington, Del.

Manufacture resins from cyclohexene oxide; heating latter with an active earth. No. 2,121,695. Rowland Hill, Blackley, Manchester, England, to Imperial Chemical Industries, Ltd., corp. of Great Britain.

Manufacture synthetic resins; heating in presence of an alkali condensation catalyst a mixture of formaldehyde and a six-membered cyclic urea derivative, acidifying reaction mixture, and evaporating water from resulting product. No. 2,121,697. Ralph A. Jacobson to du Pont, both of Wilmington, Del.

Plastic composition adapted for use in shoe filler compositions; distillation residue of the neutral, water-insoluble fraction obtained from the aqueous extract of wood. No. 2,121,745. Ernest D. Sackett, West Somerville, Mass., one-half to No. Amer. Holding Corp., Syracuse, N. Y., and one-half to Parshad Holding Corp., Syracuse, N. Y.

Manufacture polymeric methyl methacrylate as a light fluffy powder. No. 2,121,839. Daniel E. Strain to du Pont, both of Wilmington, Del.

Manufacture phenol, cresol or the like resins. No. 2,121,917. Ignaz Kreidl, Vienna, Austria.

Method molding synthetic resins and like plastic materials. No.

U. S. Chemical Patents
Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 45

U. S. Chemical Patents

Off. Gaz.—Vol. 491, Nos. 2, 3, 4—492, Nos. 1, 2—p. 46

2,121,966. Conrad C. Jacobson, Glen Ridge, N. J., to John Robertson Co., Brooklyn, N. Y.

Manufacture artificial resins. No. 2,122,089. Werner Conrad, Cologne, Germany, to Herbig: Haarhaus Aktiengesellschaft, Cologne-Bickendorf, Germany.

Production pigmented phenol-formaldehye condensation products; condensing phenol and aqueous formaldehyde in presence of solid calcium hydroxide and calcium carbonate together with lactic acid. No. 2,122,270. Geo. H. Wilder, Arlington, N. J., to du Pont, Wilmington, Del.

Production polyvinyl acetal resin. No. 2,122,277. Bozetech C. Bren, Verona, N. J., to du Pont, Wilmington, Del.

Production nitrogen-containing resins; reacting together a vinyl ketone and an ammonia type compound in presence of a liquid diluent. No. 2,122,707. Jos. H. Balthis, Jr., to du Pont, both of Wilmington, Del.

Production thermoplastic polymerization products from mono-vinyl compound. No. 2,122,805. Carl Wulff and Eugen Dorrer, Ludwigshafen-am-Rhine, Germany, to I. G., Frankfort-am-Main, Germany.

Composite material comprising an infusible thermo-setting resin firmly united to a vinyl resin through an intermediate bonding surface. No. 2,123,155. Frazier Groff, Charleston, W. Va., to Union Carbide & Carbon Corp., New York City.

Production synthetic resins; comprising alcoholysis of oils of the drying or semi-drying type with a polyhydric alcohol in presence of an inorganic basic catalytic material, and esterification of resulting product with a polybasic carboxylic acid. No. 2,123,206. Paul Robinson, Lansdowne, Pa., to du Pont, Wilmington, Del.

Rubber

Method plugging porous strata in wells; using rubber latex. No. 2,121,036. Carroll Irons to Dow Chemical Co., both of Midland, Mich.

Method increasing age-resisting properties of rubber. Nos. 2,121,618-19. Ira Williams, Woodstown, N. J., and Arthur Morrill Neal, Wilmington, Del., to du Pont, Wilmington, Del.

Method resolving ammonia-preserved rubber latex into a concentrated fraction and a weaker fraction. No. 2,122,232. James B. Crockett, Malden, Mass., to Heveatex Corp., Melrose, Mass.

Manufacture synthetic rubber from polymerizable hydrocarbons. No. 20,777. Reissue. Wm. S. Calcott, Woodstown, Fred B. Downing, Carneys Point, and Donald H. Powers, Moorestown, N. J., to du Pont, Wilmington, Del.

Method gassing rubber dough; using carbon dioxide in process. No. 2,122,438. Dudley Roberts, New York City, and Thos. A. Scott and Fred. Wm. Peel, Balto., Md., to Rubatex Prods., Inc., corp. of Del.

Manufacture composite rubber thread, using an adhesive coating in process. No. 2,122,728. Thos. Lewis Shepherd, London, England.

Textile, Rayon

Manufacture spun goods, fabrics, etc., using threads obtained from animal hide material, in final treatment rendering threads waterproof by treatment with tanning agents. No. 2,120,851. Oskar Walter Becker and Hans Freudenberg, to Carl Freudenberg G. m. b. H., all of Weinheim, Germany.

Production improved artificial materials having a basis of organic ester of cellulose. No. 2,121,040. Robt. Wighton Moncrieff and Chas. Wm. North, Spondon, near Derby, England, to Celanese Corp. of America, corp. of Del.

Manufacture a marked material. No. 2,121,041. Willard L. Morgan, Hammond, Ind., to Sylvania Industrial Corp., New York City.

Reduction lustre of cellulose acetate fabric; passing same through aqueous solution of titanium tetrachloride, then through an atmosphere of steam and ammonia. No. 2,121,341. Henry Dreyfus, London, England.

Reducing lustre of artificial silk by impregnating same with a double salt of a polybasic organic acid with ammonia and titanium, then thermally decomposing salt with formation of titanium dioxide on material. No. 2,121,343. Henry Dreyfus, London, England.

Production artificial cellulosic material having a dull lustre, containing a uniformly distributed delustering agent consisting of finely divided acid-free precipitated and dried but uncalcined titanium pigment. No. 2,121,408. Friedrich Raspe and Hermann Giese, Leverkusen-I. G. Werk, Germany, to I. G. Frankfort-am-Main, Germany.

Method and apparatus for strengthening fibers. No. 2,121,802. Dale Kleist and John H. Thomas, Newark, O., to Owens-Illinois Glass Co., corp. of Ohio.

Process for coloring and waterproofing textiles; treating same in usual alkaline dyestuff bath containing also a stable emulsion of colorless, water-repellent substances and aluminum formate and another substance added for purpose of converting aluminum salt into a complex compound. No. 2,122,100. Rudolf Kern, Oschatz, Germany, to Chemische Fabrik R. Baumheier Kommanditsgesellschaft, Oschatz-Zschollan, Germany.

Manufacture textiles, ribbons, films, etc., from cellulose derivatives. No. 2,122,448. Ernst Berl, Pittsburgh, Pa.

Process treating raw silk for full fashioned hosiery, using oil of viscosity of 40 to 300 sec. Saybolt, universal viscosity at 100°F. No. 2,122,593. Henry A. Stafford, Ridley Park, Pa.

Production artificial threads containing nitrogen and sulfur, spinning viscose into a precipitating bath containing acid and reacting on threads with a cyclic ethyleneimine. No. 2,122,801. Walter Maier, Jessnitz in Anhalt, Germany, to I. G., Frankfort-am-Main, Germany.

Water, Sewage Treatment

Apparatus for incineration sewage sludge and other waste materials. No. 2,121,662. Henry J. Hartley, Hastings-on-Hudson, N. Y., and Dudley Baird, Berkeley, Calif., to Nichols Engineering & Research Corp., New York City.

Sewage treatment process. No. 2,122,074. Ralph A. Stevenson, San Marino, Calif.

Apparatus for disintegrating large solids contained in sewage. No. 2,122,965. Eskil W. Swenson, Cherry Valley, Wis., to Chain Belt Co., Milwaukee, Wis.